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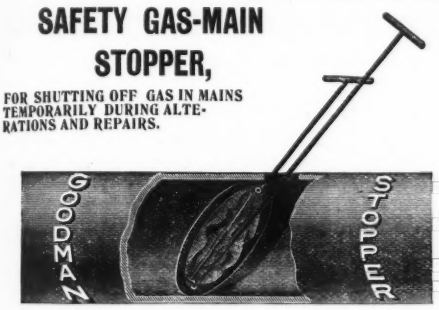

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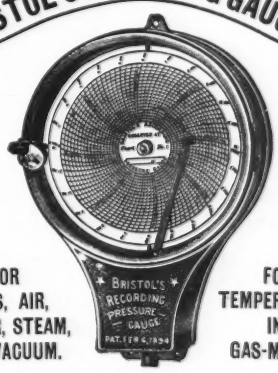

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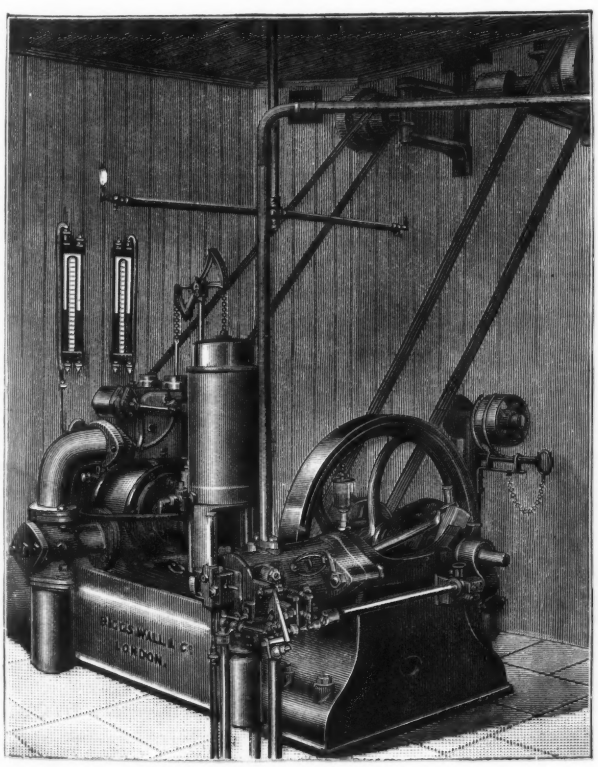

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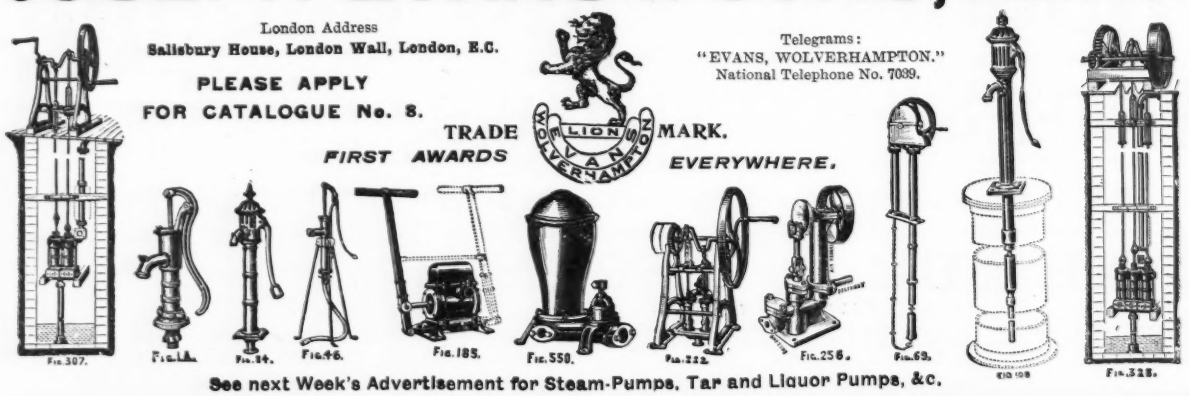

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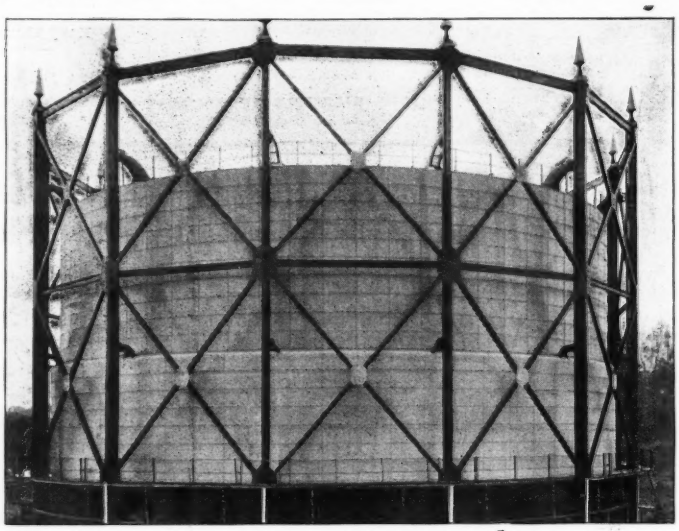

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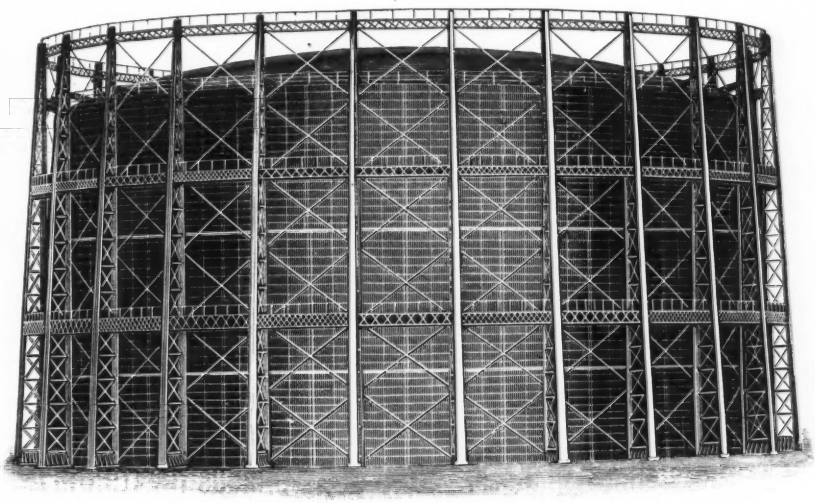

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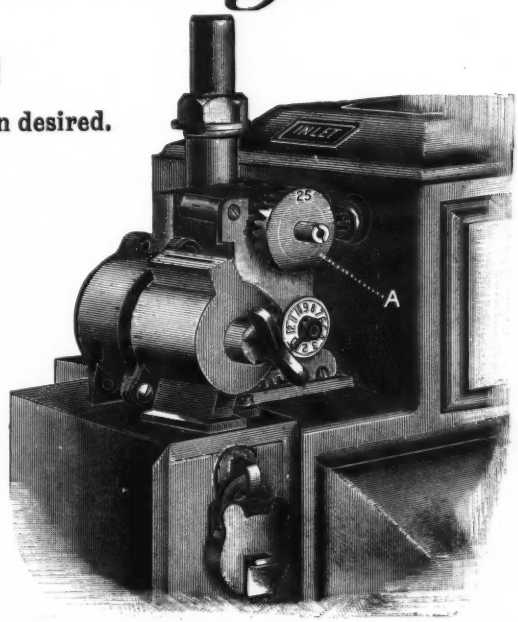

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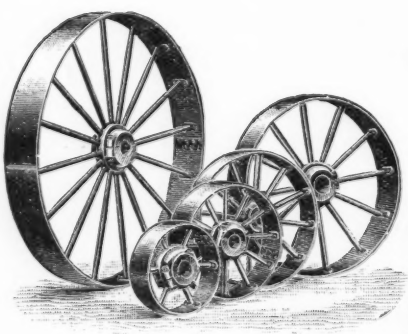

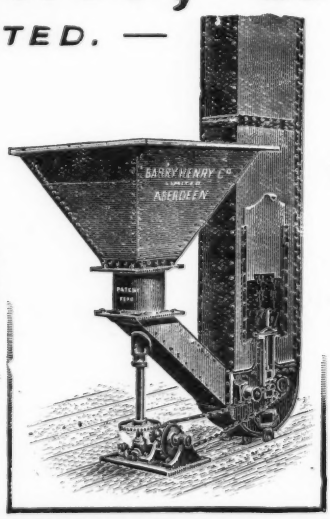

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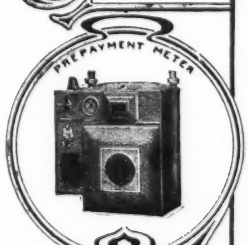

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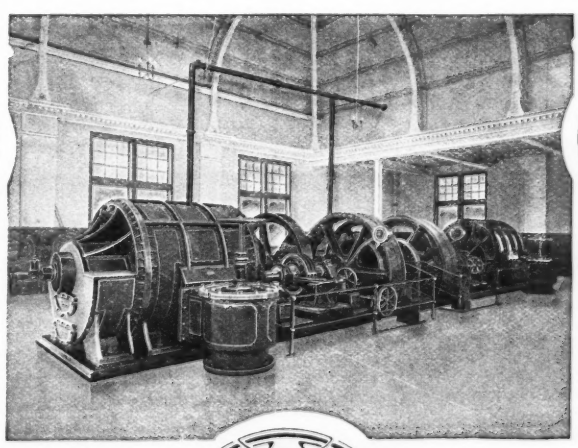

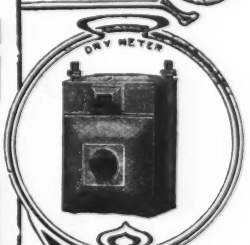

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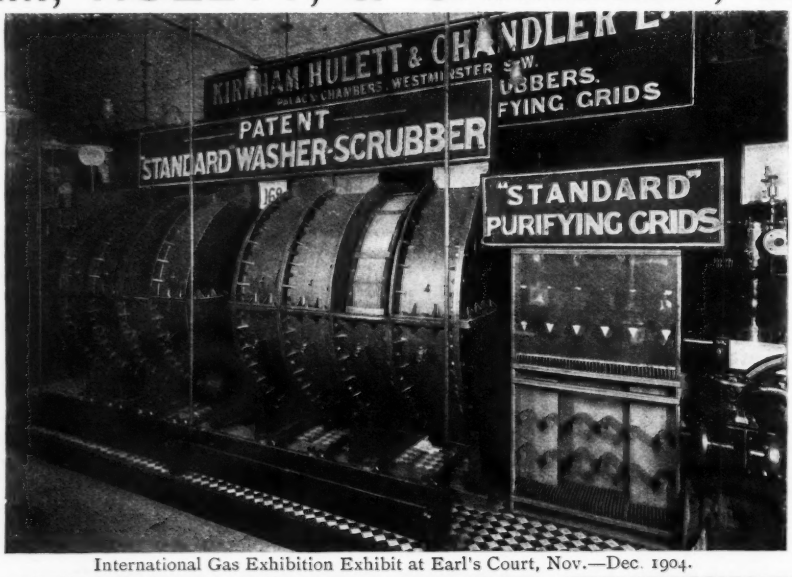

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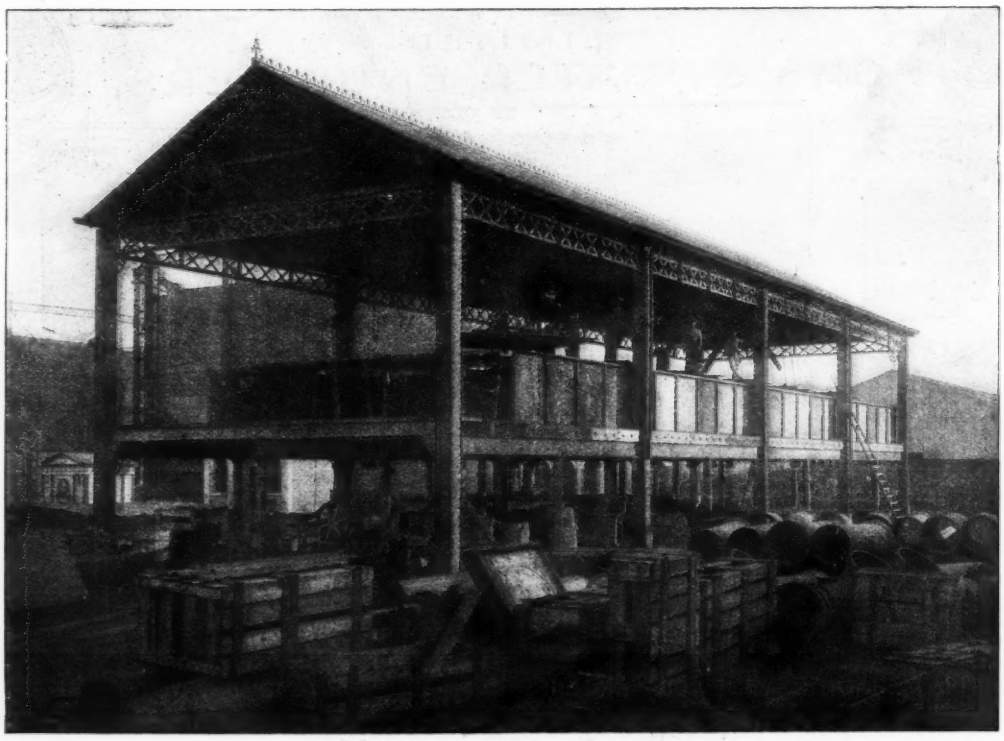

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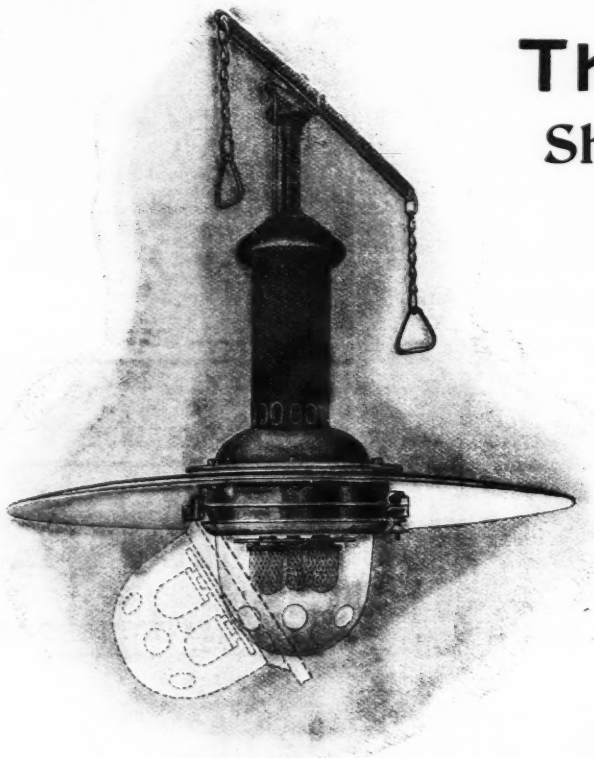

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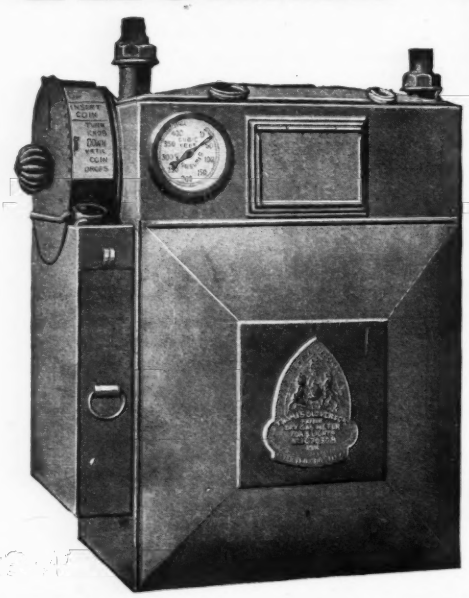

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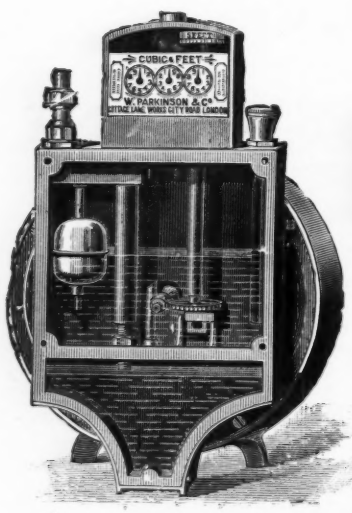

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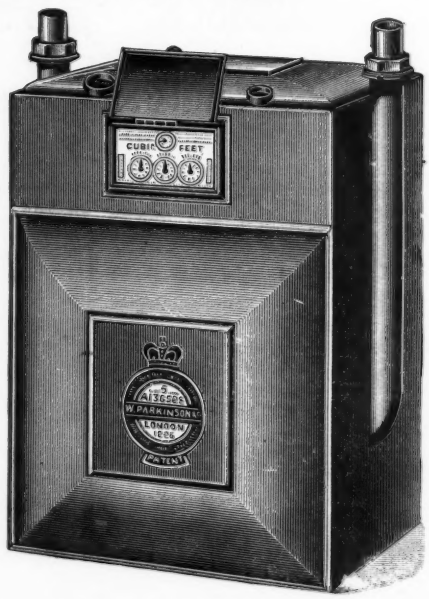

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EDITORIAL NOTES—GAS, &c.

The Opening of Parliament and the King's Speech.

THE custom of opening Parliament by the Sovereign in person, which fell into disuse under Queen Victoria, has been revived with great satisfaction to the lieges. The stately ceremony last Tuesday, when the King, accompanied by her Majesty Queen Alexandra, drove in state from Buckingham Palace to Westminster, gave pleasure to the huge crowds assembled all along the line of route, and was in every way worthy of so great an occasion. Such a ceremony is much more than an interesting and imposing pageant. It indicates in a manner not to be misunderstood, the connection that, in accordance with the Constitution, exists between the Crown and the Legislature, between the three Estates of the Realm—King, Lords, and Commons; the King's Speech being the medium for conveying to the listening senators the position occupied by His Majesty's Ministers with regard to current politics, both foreign and domestic. More than usual interest attached to this occasion, owing to the fact that the present Parliament is—for a Parliament—getting into years; and that other circumstances point to the possibility of a dissolution at almost any time. The House of Commons has, in fact, been described as consisting only of two parties—dissolutionists and anti-dissolutionists. However this may be, the somewhat strange spectacle is presented of a party, backed by a strong majority in the House, showing no disposition to appeal to the country, which, so far as the results of the bye-elections may be regarded as an indication of the general feeling, is decidedly against it. The anomaly and inconvenience of such a state of things are apparent enough. They are revealed not only by the comparative paucity of legislation, but also by the character of such legislative proposals as have been made.

On the chief cause of all this trouble, the King's Speech is silent. There is not a word in it about the fiscal question, which, twenty months ago, Mr. Chamberlain declared to be urgent, but which, according to appearances, is relegated to the somewhat dim and distant future. Redistribution of seats seems to have been discovered to be a more pressing necessity, and, according to the plans of Ministers, is to occupy the attention of Parliament during the next two years. Other measures, however, which, by their titles, should prove to be of an exceedingly useful character, are promised. There is, of course, to be an Aliens Bill, which, it is understood, will be of a less drastic character than the one that was promoted last year. The question of the unemployed is also to be dealt with; it being considered expedient to provide machinery of a permanent character to cope with the distress which the want of employment occasions. An effort is again to be made to amend and extend the Workmen's Compensation Acts; while it is also proposed to amend the laws relating to notification of industrial accidents, and with respect to valuation authorities and the procedure for making valuations. The last-named subject may almost be regarded as a "hardy annual"—it having been brought forward each session for the last three years. One other matter in which all engaged in municipal work or industrial undertakings are interested, is the proposal to improve the status of the Local Government Board and the Board of Trade, and to establish a Minister of Commerce and Industry. The other subjects to be dealt with are of more general interest. There is, indeed, material enough for a useful, if not highly exciting, session. There will be general satisfaction on one point—the improved financial outlook. The forebodings of a large deficit which were so freely indulged in a few months ago have already given way to a much more hopeful feeling; and it is even anticipated in some quarters that the Chancellor of the Exchequer will, by reason of saving in the estimated expenditure and the improvement in trade, be able to announce reductions of taxation. This sounds almost too good to be true, having regard to the heavy taxation and expenditure of the last few years. At the same time, nothing would be more popular, or would tend in a greater degree to encourage reviving industries. To allow the people's savings to fructify, instead of dissipating them in extravagance and waste, should be the first care of any Administration worthy of the name.

The Institution of Gas-Works Contractors and Manufacturers.

CAUTION, provided it is not carried to foolish extremes, is a virtue to be commended. Believing this, we are more pleased than otherwise that the fifty or sixty gentlemen who met, under the chairmanship of Mr. Charles Clare, at the Holborn Restaurant last Thursday afternoon, to discuss the question of the formation of an Institution of Gas-Works Contractors and Manufacturers adopted the course of appointing a Committee to thoroughly consider the details of the proposal; and (as we understand the decision) to, if possible, frame a concrete scheme for submission to the whole of the firms in the country whose members would be eligible for inclusion in such an organization. For our own part, the suggestion having emanated from the "JOURNAL," we thank those constituting last Thursday's meeting for giving the matter their serious and thorough attention. There were those at the meeting who considered the idea a good one—who believed that such an Institution could do beneficial work both independently and in conjunction with the existing technical societies of the industry, and that the organization would foster an *esprit de corps* among contractors and manufacturers which, in their disunited state, is, in the best manner, impossible at the moment. There were others who were afraid that such an Institution might be regarded as being somewhat inimical to the "other part" of the industry. That is precisely what the Institution, as we have entertained the idea, is not intended to be; and by the character of the work undertaken, by showing from the outset an intention to live up to a high standard of usefulness, if any such feeling exists other than in the minds of a few of the contractors and manufacturers, the feeling will be promptly dispelled. The very wrecking of the scheme on such a feeling as this would be a confession of inability—of a deficiency of strength—to work in amity, and along a line of usefulness, with other parts of the industry. Then there is a small section who fancy that something in the nature of a "club" would suffice. We sincerely hope that the idea will not degenerate into anything of the kind. A club would not command the respect that an Institution, with a Council of good representative men, would do; and the fundamental object of usefulness would be entirely destroyed.

Among those present at the meeting were some who are of opinion that an Institution is now a certainty as the outcome of the discussion. We hope that their opinion will be supported by the result. But anyway for the moment we are completely satisfied with the appointment of the Committee to investigate the question; and their report and scheme will be awaited with no small amount of curiosity. Meantime, we invite attention to (as an illustration of what co-operation can do) the interesting event which followed the afternoon meeting. There was a dinner at which a prominent member of the gas profession was the guest of the Earl's Court exhibitors, and to that gentleman a presentation was made. This was an event that could only have been possible by combined action. If merely one or two firms had interested themselves in this matter,

there would have been no dinner and no presentation. It was a unique function in the gas industry; and it was an occasion that every man present will store among his most pleasant and cherished recollections, not excepting the guest himself. We remember again that the standardizing of pipe and meter unions was at one time a prominent topic of discussion in the gas industry; and we also recollect that, because there was no representative body on the side of the manufacturers who could take the matter in hand, the question dragged wearily along for a considerable period. There was the recent exhibition. Where was the body to represent the manufacturers on that occasion? In the younger electrical industry to-day, it is the National Electrical Manufacturers' Association who are taking the initial steps in organizing a general electrical exhibition. There is an opening, too, for usefulness in assisting to found an experimental gas plant. The question has often been raised, but never developed, though everybody recognizes the service it would be. Such an experimental plant could well be established, and conducted jointly by the Councils of the two Institutions, for the testing of new gas apparatus and appliances and for experimental work. These points are only mentioned here for illustration. As time progresses, no end of work mutually useful to the two sections of the industry would, we feel sure, come to hand; and the investigation of the Committee appointed last Thursday will, there can be little doubt, present to the view other work which will justify the establishment of an organization such as is under consideration.

The Returns as to Gas Undertakings.

THE returns relating to the gas undertakings of the United Kingdom for the year 1903 as regards the Companies, and the year 1903-4 for the Local Authorities, were issued yesterday, and the principal totals will be found in another part of the "JOURNAL." They have been anxiously awaited by many of our subscribers, who have for some weeks been making inquiries on the subject, and not without reason. The preceding returns were ordered on the 11th of August, 1903, and were issued on the 7th of January following. Those now under notice were ordered within one day of the corresponding date last year, and they make their appearance six weeks later than their predecessors. This is not owing to the large addition to the statistics, for there are only nine more undertakings making returns—being 719 against 710 before. It will be seen that the total capital employed in the supply of gas on the dates to which the statistics were last made up was £117,972,458, out of £138,213,333 authorized. The Companies have raised £80,869,179, and the Local Authorities £37,103,279. This capital was used in producing rather more than 164,207¾ million cubic feet of gas, of which about 151,677½ million cubic feet were supplied through 30,026 miles of mains to 4,331,125 consumers and 636,671 public lamps. The contemplation of these figures simply astounds one; but they show at a glance the magnitude of the gas industry of the country. When the returns were first published (for 1882), the Companies made 49,360¼ million cubic feet of gas; now, for the first time the make has added a figure to the original five figures, and brought up the total to 101,490 millions; while the Local Authorities' make has risen from 23,223 to 62,717¾ millions. And yet not many years ago the industry was said to be moribund, and the plant employed therein rapidly becoming useless! The particulars given elsewhere show the extent to which other materials than coal are relied upon by gas manufacturers, and especially carburetted water gas. Returns in regard to the latter appeared for the first time in 1898-9, when the Companies sent out about 5125¾ million cubic feet, and the Local Authorities 2278¼ millions. Now the figures are 13,056¾ and 4850 millions respectively. Not the least interesting portion of the statistics we reproduce is that showing the maximum proportion in which this auxiliary is mixed with the ordinary coal gas. In some cases it has been raised and in others lowered as compared with the immediately preceding returns. The latest addition to the number of illuminants—acetylene—is still used to the extent of 86,600 cubic feet per annum at Portsoy, in Banffshire, the inhabitants of which are willing to pay 6s. per 100 cubic feet for the luxury. It is unnecessary in these columns to deal further with the returns. They are at last available; and we leave them for our readers' study.

Points from the Commercial Company's Meeting—Sir George Livesey's Retirement.

THE meeting of the Commercial Gas Company on Thursday completes the directorial review of the progress of the Metropolitan gas industry during the past six months. In the main, the features of the half-year's history of the northern and southern sections of the three divisions of London gas supply have been dealt with in previous issues of the "JOURNAL;" and this leaves for reference only the affairs of the Company charged with the supply of the densely populated eastern district. The London Gas Companies have been, and are still, passing through critical legislative times; and no one will be more thankful than those responsible for the administration of these large concerns when a state of repose is once more reached. It is hoped, and even anticipated, that the present session will see affairs composed in a manner that will conduce to the best interests of the gas-consuming public. But it is with the domestic affairs of the Company serving East London that we are at present concerned. In respect of business and financial results, the half-year's working is really better than might have been expected, having regard to the peculiarities of this part of the Metropolitan gas area. The condition of trade is a certain indicator in the case of the Commercial Company of what the financial results of a half year will be. There has been a depression of trade; and when trade is bad, East London feels its pinch quicker than any other portion of London, owing to the characteristics of its working population, and the Gas Company are also speedily made aware of the limitation of the spending power of their consumers. So it was in the past half year; and this, combined with the fact that gas was being sold at 1d. per 1000 cubic feet less, and the market for coke and tar was not so favourable as in immediately preceding periods, the Company did not succeed in earning their interest and dividend by between £4000 and £5000; and by that amount the sum carried forward into the current half year is less than the balance brought into the past half year. To put the financial result briefly, the sum brought into last half year was £24,116; the amount available for distribution at the close of the year was £77,628; and, after meeting the interest and dividend charges at the same rate as in the preceding half year, the carry forward is £19,473, or a reduction of £4642. Under the circumstance of the reduction in price coinciding with an acute depression in trade and a fall of £4777 in residuals (which alone exceeds the £4642), the smallness of the requirement from the undivided balance cannot be looked upon with anything but satisfaction.

The prospects, however, are good. Notwithstanding that the gas-supply district is what may be described as endogenous in character—being hemmed in on all sides—the development of the Company's business is going on apace. Evidence on this point was a feature both of the copiously pointed address of Mr. W. G. Bradshaw to the proprietors and of the subsequent remarks of the Engineer (Mr. Stanley H. Jones). The day consumption, through the considerable increase of gas-stoves (and we think we may add through the requirements for motive power), is rapidly extending; and upon this the prepayment meter business shows no sign of the approach of a retrograde movement in the rate of expansion. The general trade of the district, too, is again brisking up; and altogether the portents are full of promise. Contributory also to still greater success are the steps taken to produce further economy in the works by the application of the most modern methods; and the completion of the Company's own fleet of steamers will ensure the delivery of the coal supply on to the works at the least possible expense. All this must be productive of the most pleasant reflections in the minds of the proprietors, although faced by the fact that, under the abnormal conditions ruling during the past half year, sufficient was not earned to cover the necessities of interest and dividend.

If the material were available, and someone could be induced to write an account of the inner affairs of the three Metropolitan Gas Companies, more particularly in relation to the bearing of the distinctive characters of the different districts on gas consumption and the experiences of the management, there is not the slightest doubt that some entertaining reading for gas men would result. In his speech, Mr. Bradshaw gave the principal figures of an analysis that

has been made of the bad debts which figure in the past half-year's accounts. The result is curiously indicative of the small character of a large part of the business in gas consumption with which the Company have to deal; and, of course, this has its effects in several ways upon the expenses which have to be incurred in connection with such a class of business in comparison with those districts in which the average business done through one service-pipe, meter, and the final account and collection, is of a larger order. The amount of the bad debts for last quarter was £559; and, dividing this among the 540 debtors, it is found that the average debt is the comparatively insignificant one of £1 0s. 8½d. This really tells its own tale; but supplementary particulars concerning it were duly given by the Chairman. Another part of his address to which readers should pay earnest attention is that in which he treats of the ever-increasing rate burden. On this Mr. Bradshaw spoke with the warmth of a man protesting against grave injury, and in the expressive manner characteristic of him, which delights the ears of his audience, but puts to the severest test the skill of the reporters. One point from his remarks makes manifest what municipal extravagance is doing for this one trading concern alone, and is illustrative of what it is doing for others and, in their individual degrees, for private householders. In 28 years, the capital expenditure of the Company has increased by 129 per cent.; but the rates in the same period have increased by 288 per cent., or more than double the rate at which the capital has advanced. Small wonder that people are wearying of the growing burden. Instructive, too, are the Chairman's observations as to the effect on industrial concerns and their productions of the new tactics of the municipalities in obtaining money by borrowing sums from small depositors. The only hope of relief from the rate incubus that the Chairman can see is through working men; but how to force the truth of the position home sufficiently to incite them to any action is a problem that has yet to be solved.

In language manifestly reflecting his heartfelt feelings, the Chairman referred to the relinquishment by Sir George Livesey of his seat at the Board. The Chairman, however, assigned as the reason of retirement the weight of "advanc-"ing years," and, in the report of the Directors, it was ascribed to "considerations of health." Those who have been brought into contact with Sir George since his return to active participation in London gas affairs, will be disposed to dispute the complete pertinency of these statements, which are evidently the result of the accidental proximity of Sir George Livesey's temporary constitutional affliction and his retirement from the Board. We believe the assertion may be made that the principal reason of his withdrawal was that he desired his public engagements to be lightened, so that he might have more liberty to concentrate his energies and interest upon the work of the two Southern Companies of which he is Chairman. This is only, in his case, a very natural inclination. In the larger of the two Companies has been centred Sir George's life's work; and, in the smaller, though also important, Company, he has occupied the place at the helm for many years. It is now his desire to devote, as exclusively as events permit, the available time of such years of activity as are given to him to the interests of those two Companies. The loss of Sir George's unique, experience and counsel to any gas company has no compensating side; but at the same time it must be recognized by the onlooker that Sir George's special work in connection with the Commercial Company has been completed, so far as he was able to carry it. He won the Chairman and Board and his friend (Mr. H. E. Jones) to see the strengthening virtue of his doctrine of trinitarian co-partnership; and to-day many East London consumers are shareholders in the Company, and the Company's own men have already a substantial interest in the undertaking—represented by upwards of £14,000.

Partly associated with the retirement of Sir George Livesey, and the proceedings at the meeting last Thursday, there is one matter upon which outside criticism has been liberally passed since the issue of the Directors' report; and it was rather anticipated that something might have been heard on the subject at the meeting. Proprietors, however, find it difficult to resist the charming individuality and eloquence of their able Chairman. The point only requires mentioning; and it is this: While the Company have done well through the gifted families who have had connection with its administration in the past, it is a question whether the principle of preferment through paternal interest, or hereditary succession, in the direction of the affairs of concerns such as this cannot be carried too far. It is preferable—the wisdom of the view must be conceded by the disinterested—that those taking part in the administration of such an undertaking should be drawn from as extended a circle as possible, consistent with special qualification. Because in two instances the passing of the mantle of the father to the son has, through special ability and training, maintained unbroken the chain of success, that is no proof that the further restriction of management by directorial or official appointment of family connections is in the best interests of the Company, nor is it likely to secure (each step in this direction checks it) the application of the greatest individual judgment and independence of action. This is said without any personal reflection, or the questioning of capacity.

Mr. Corbet Woodall on Gas Topics.

Occasion was taken by Mr. Corbet Woodall, in his address to the proprietors of the Tottenham and Edmonton Gas Company on Saturday, to proclaim his concurrence with the finding of the Board of Trade Committee in respect of the lime purification of gas. Those who attentively studied the abstract report which we gave of the proceedings before the Board of Trade Committee will have seen that Mr. Woodall, from the first, was in favour of relaxing the stringency of the conditions under which gas manufacturers labour in this particular regard. But to those of our readers who were unable to wade through the mass of material which that inquiry yielded, the point may have escaped notice; and this is the first occasion, so far as we can remember, that Mr. Woodall has spoken publicly upon the matter. He puts the position in a nutshell, when he says that the obligations of purification (of course, he is referring only to gas-works where lime purification is a present necessity), though they are not very costly, are burdensome to gas manufacturers and injurious to the workmen; and, Mr. Woodall might have added, an intolerable nuisance to everbody residing round about a gas-works where the system is in vogue. He has little doubt that, when relief is granted to the Metropolitan Companies through the Bill now before Parliament, similar consideration will be extended to gas-works outside London; and he gives his word to the consumers that the modifications will not impair the quality of the gas. The Tottenham Company, in all probability—seeing that they are running close to the end of their capital resources—will be in Parliament next year; and so it may be taken that they will then seek some mitigation of the severe obligation imposed upon them by their Act of 1898 to bring the sulphur content of their gas below 20 grains per 100 cubic feet. It is interesting to observe, in view of recent developments and of Mr. Woodall's association with undertakings on the Continent where experimental work is being vigorously prosecuted, that he is of opinion that we are "on the eve of further im-"provement in the methods of manufacture which will add "materially to the strength and stability of the gas industry." In regard to the affairs of the Tottenham Gas Company, the past half year has seen, under the energetic guidance of the Engineer and Manager (Mr. A. E. Broadberry) and the Secretary (Mr. James Randall), a continuation of that most remarkable development which is becoming with them a common experience. Not only in the past half year was the loss of revenue represented by a 2d. reduction in price recouped, but beyond this the substantial balance of £5000 was netted. Such a flight in business as this, coming upon a continuity of others of similar character, maintains in an uncommon degree a lively state of things for those officially concerned in the affairs of the Tottenham Company.

A Trivial Case.

The members of the Lewisham Borough Council cannot be congratulated upon the manner in which they are pursuing the South Suburban Gas Company. Their attitude of late is to keep the Company under close surveillance, and bring them under the hand of the law for the most petty defection. The Borough Council have never, during recent years, been well disposed towards the Company; nor has their inclination ever been in the direction of friendly consultation in any effort to obtain redress of a grievance,

real or supposed. There must be one of two things which animates them—either some acute hatred of which no one outside their body can fathom the cause, or they are mistaken in their estimate of the dignity of their position, which estimate will not permit any approach to amicable conclave with a company who are trying to serve, and who are as a matter of fact serving, the interests of the people in the best possible manner, as it appears to men who are not only experienced in gas administration, but who have made names as initiators of fresh administrative policy that has redounded alike to the good of not only the gas industry, but of the consumers of gas.

With the Lewisham Council, there is no other channel open to them of meeting these men but through the law, and to seek means, however trivial, of doing so as frequently as possible. Gas-works in every locality are of the most important of private enterprises; but, unlike most other enterprises, they are—as the penalty of their monopoly in the supply of ordinary gas, though not of light, heat, or power—bound all around with parliamentary ordinances. They are compelled to do this and that; and in so doing—in conducting as they do a huge manufacturing process, in every department on a large scale—they cannot (it is a matter of utter impossibility) carry on those operations with the nicety of laboratory performance. That Parliament recognizes this is shown by the express exemptions that they give to gas-works through such occasional expressions in their governing Acts as "as far as practicable," and "unavoidable cause or accident." These are matters the Lewisham Borough Council conveniently overlook in seeking for opportunities of bringing odium upon the Gas Company through the Police Court for trivial offence, even though it requires no finely trained legal mind to see that the law is prepared to excuse certain such offences in cases where they are unavoidable, or where the work necessary to avert them is impracticable. The law may be an "ass;" but it is not such an "ass" as not, for example, to understand that in gas-works and other immense manufacturing operations intermittent discharges of smoke from chimneys may happen, and that this, when everything is done to avoid its being constant, ought not to constitute a penal nuisance.

We need not explain here the particulars of the action which the Lewisham Council brought against the Company in respect of two instances of black smoke issuing from one of their retort-house chimneys on the same day; the two extending over a period of time which even the eyes of a sanitary inspector would not permit him to describe as greater than four minutes! The proceedings are fully reported in our "Legal Intelligence" to-day; and it will be remarked that this assumed serious infraction of the law, the Magistrate could not find it within him to characterize a nuisance. He therefore dismissed the summons, and allowed the Company five guineas costs. But our point is this, that the Council deliberately—their proceedings clearly show it—so conducted this particular prosecution as to debar the Company of the right given them by Parliament to refuge under Sub-section A of Clause 24 of the Public Health (London) Act, 1891, which provides that any fireplace or furnace which does not, *as far as practicable*, consume its smoke in manufacturing trade processes is to rank as a nuisance. The Company would have been prepared to prove, given the opportunity, that their retort furnaces were constructed and tended so as to "as far as is "practicable," comply with the requirements of the Act. The Council might themselves have inquired into this; or the least they could have done, if generosity has any part in their legal dealings, was to have left the door open for their opponents to advance the best defence allowed them by Parliament. That they did not do so, only permits of one conclusion being drawn by those outside. After perusing the report of the case, and considering previous proceedings, perhaps readers will think that Pope's words are not altogether inapplicable to this Council: "They think "our Doctors asses to them; we'll think them asses to our "Doctors." It is probable that the Council will be, or have already been, invited to consider the question whether application should not be made to the High Court to obtain an order instructing the Magistrate to receive evidence on the matter of the "nuisance," which evidence he excluded as not having reference either to the summons or to the statutory notice to the Company. If the Council have sufficient wisdom to take heed of the statement of Mr. Horace Avory, K.C., at the Greenwich Police Court on Wednesday last, the Courts will hear nothing more of this particular matter. But that will not debar the Council, if they have a mind for further litigation, being vigilant in watching for a fair opportunity—"fair" may be emphasized—of trying to convict the Company of a nuisance in respect of their retort-house chimneys.

Honour for Mr. James W. Helps.

However much the recipient of honour at the hands of his fellow men may dissent from the necessity or propriety of its bestowal, those who bestow take the liberty of completely disassociating themselves from his views. Good, voluntary, self-sacrificing work which yields to the common benefit merits reward and recognition; and it is right and proper that it should be so. Whether the honour should be memorized in substance or in a less tangible manner is a point upon which opinions may be divided; but we incline to the opinion that suitable substance has a durability about it and an ever-present materiality which, under the special circumstances of its presentation, reminds one of the cause of its possession, of pleasant associations, of an occasion of the manifestation of goodwill of one's fellows, and of their appraisement of the value of one's labours. In another column, it will be seen that the exhibitors at the recent Earl's Court Gas Exhibition have presented Mr. J. W. Helps with a piano, as a mark of the great esteem which they bear towards him, and which was strengthened by their close association at the exhibition. From the commencement of the handling of the multifarious details surrounding and running through the whole organization of that great exhibition, the negotiation of those details as they were assembled, and onward to the closing of the doors upon the brilliant success, no man worked with greater devotion and ardour than Mr. Helps. Much as he desired that, if any thanks were deserved, they should be simply expressed and ended, the exhibitors on their own part had other views; and determined that, in one way or other, Mr. Helps should have with him in his home life some reminder of the great regard that his personal qualities and inestimable work had won from the exhibitors. No man could resist this; and, with the simple condition that the subscriptions should be limited to a moderate sum from each contributor, so that the presentation should be expressive of goodwill rather than reward, the exhibitors have consummated their desire. The occasion is indeed a propitious one for signalizing the work of Mr. Helps not only in connection with the exhibition, but our technical organizations. Not only was he the centre of activity in the gas exhibition, but, looking farther afield, his diplomacy and labours did more perhaps than any other man's to shape the course of events which brought the members of the old Institute and Institution into one corporate body. Mr. H. E. Jones, referring to the Gas Exhibition at the meeting of the Wandsworth and Putney Gas Company (as will be seen by the report in another column), publicly expressed the view that "a substantial recognition was due to Mr. Helps for his invaluable services in this matter." With this expression of opinion there will be general consonance in the gas profession; and, knowing how strongly Mr. Jones feels this, there is every likelihood that he will take the initial step in the matter of marking the profession's appreciation and respect at the meeting of the Council of the Institution next Tuesday. Whether Mr. Helps deprecates it or not, honour is due to him at the hands of his colleagues; and there are several ways in which it can be conferred. Those ways, until the subject has been before the Council of the Institution, it would be improper to suggest and discuss here.

The New Chairman of the Lords' Committees.

The gas industry have an especial interest in the change which was effected last Thursday afternoon in the Chairman of Committees of the House of Lords. All who have been, in the passing of Private Bills through Parliament, brought into the presence and under the examination of Lord Morley will sincerely regret that his Lordship's health has made it impossible for him to retain the post which he filled with so much grace, though in the gas industry there may have been occasions when we have believed that he has not always appreciated the justice of claims to protection called forth by the recent progress of events. Owing to the ill-health of Lord Morley during last session, Lord Balfour of Burleigh undertook the duties; and it will be remembered

how, through the conflicting decisions of the Chairman of Committees of the Lower House, of Lord Balfour in the Upper House, and of the Select Committees, a state of some confusion was arrived at in the matters of the Bermondsey or Northumberland clauses and of the electrolysis question. Lord Balfour, on certain occasions, acted in connection with these claims to protection in a manner which led to the assumption that it must be his opinion that the views of Parliament should be subordinate to those of the Board of Trade. Lord Balfour will not, through private reasons, be seen performing the same offices in Parliament this session. Therefore, by a unanimous vote in the Lords on Thursday, the Earl of Onslow was elected to the position; and he will consequently relinquish his place in the Government. Whether there will be a more liberal treatment of the questions referred to above under the chairmanship of the Earl of Onslow, and a little less ruthless ruling-out of clauses admitted by the Lower House, remains for time to determine.

Local Authorities and the Salary Question.

If there is one occasion more than another on which one can safely look for a foolish remark or two in the course of the proceedings of a local authority, it is when a motion is being discussed which has for its object an increase of the salary of an official. As a set-off against this lamentable fact, however, one sometimes—though perhaps not quite so frequently—comes across in these debates words of real wisdom. Instances of both were afforded at last week's meeting of the Widnes Town Council, when the members had before them a recommendation of the Gas and Water Committee that the salary of the Engineer, Mr. Isaac Carr, should be increased. The first gentleman to distinguish himself was one who asked whether the gas-works belonged to the ratepayers of Widnes, and if the Engineer had any shares in them. He was easily satisfied; but a later speaker was much more exacting in his requirements, for he said that unless Mr. Carr got the price of the gas down to 6d. per 1000 cubic feet he did not feel that he could support any further increase in his salary. This is a task which it is to be feared—for the present, at any rate—is beyond even the power of Mr. Carr to accomplish. It is, of course, only fitting and proper that due consideration should be given to any proposal involving additional expenditure in salaries, as well as in other directions; but at the same time it cannot be denied that the long and personal public discussions of this kind that so frequently take place are one of the most unattractive features of corporation employment. So far as the debate at Widnes is concerned, Mr. Carr came through the ordeal well, for there was a most pronounced disposition on all hands to recognize his great services to the town. He has got his increase—and we heartily congratulate him upon the fact—though doubtless it would have been more welcome had it been accorded with something a little nearer to unanimity.

Prepayment Meter Experiences and Theories at Brentford.

A point was made by Mr. Howard Charles Ward in his address to the proprietors of the Brentford Gas Company, at their half-yearly meeting last Friday, with reference to the consumption of gas by prepayment meter consumers. There has been a decrease in the average consumption of these consumers on the penny-in-the-slot system; and for an explanation Mr. Ward does not even venture on conjecture. He quotes Sir George Livesey's opinion that it must be due to the use of the incandescent gas-burner by the poorer consumers. There is no doubt that method of using gas for lighting purposes is invading, to their profit, the homes of the working class; but it is more likely that the greater portion of the decrease in consumption is due to the necessity, during recent "hard times," for the practice of rigid economy. We are rather inclined to this view than to the incandescent burner theory, as the number of burners used, as a rule, in a working-man's house is not so great that the gradual change that is going on in the homes of that class of consumer, from the flat-flame to the incandescent gas-burner, can alone make such a marked difference as Mr. Ward indicates in the average consumption. While, however, this has been the experience with the ordinary penny-in-the-slot consumer, it is interesting to note that the business done through what the Company call their "current-price" meters is bounding upwards. This is the shilling-in-the-slot meter; but the consumers pay a rent for the meters and purchase their gas, by the deposit in the slot of a shilling, at the ordinary current price. Under this system, the Company last year obtained an increase of consumption of no less than 14,661,000 cubic feet, or equal to 51 per cent. compared with 1903. This rather lends colour to the view that the necessity for exercising economy among the poorer consumers (who would be the penny-in-the-slot ones) is the chief explanation of the recession from the former average consumption, seeing that the shilling-in-the-slot system (the consumers under which can better afford to pay) achieved in the same period such very remarkable success. The report of the proceedings at the meeting shows that the Company, notwithstanding the reduction of 2d. per 1000 cubic feet in the price of gas and the failure of coke and tar to yield such good returns as in the corresponding period of 1903, did excellently in the past half year; and both the Engineer and Manager (Mr. James Husband) and the Secretary (Mr. W. Mann) have been remembered in the dispensation of the good things which ensue from business prosperity. For gas-works officials, prosperity means increased work; and such officials can rejoice the better with the shareholders when this is remembered and commensurate reward is bestowed. The shareholders will also in due season obtain the benefit which is accruing to them from the last reduction in price.

Progress at Newcastle.

As usual just at this time of the year, readers are being informed, by the reports appearing in the pages of the "JOURNAL" of the meetings of the various gas companies, as to the progress of the industry with the welfare of which they are all concerned. Among the meetings falling to be noticed this week is that of the Newcastle-upon-Tyne and Gateshead Gas Company, which will prove satisfactory reading for a very much larger circle than the 1800 shareholders immediately concerned. The Company enjoy their share of the record breaking which is continually going on in connection with gas undertakings; for in spite of a reduction in price involving a sacrifice to the consumers of about £10,000, the profit last year was the highest ever made, while naturally the output of gas also constituted a record. Excellent as the results attained are, the Board show no tendency whatever to rest content with what they have achieved. The stoking machinery already fitted up has proved so useful in reducing the cabonizing charges that the system is to be still further extended at Redheugh; while the Elswick works are to be reconstructed on modern lines. The fact that there is at present a difference of about half-a-crown in the cost per ton of coal carbonized at the two stations is sufficient to indicate the improvement that may be anticipated from the capital outlay on the latter work. But the Board are very wisely not allowing the heavy expenditure which thus lies in front of them to interfere with the policy of selling gas at the lowest possible price; a new table of discounts having been prepared, with the object of offering a further inducement to large consumers. Under this arrangement, the lowest price will be 1s. 6d. per 1000 cubic feet, except to the Newcastle and Gateshead Corporations, who will get their gas at a little over a half-penny cheaper. This concession means another gift to the consumers amounting to £6000 or £7000. No wonder, under all the circumstances, that the Chairman of the Company (Sir W. H. Stephenson) should look forward with confidence to the future; for the policy of the Board is one that can only lead to success. Everything that can be suggested is done to assist the sale of gas for light, heat, and power; and under such favourable conditions as these, gas, with the many advantages it possesses, is bound "to go."

Parliamentary Agents and Commissions.

Some time since comment was made in the "JOURNAL" on the pernicious system of certain Parliamentary Agents of paying commissions to Clerks of Local Authorities for work entrusted by the latter to the Agents. Indignant protests were made over our references; but there was good and sufficient evidence to show that the practice was a considerable one. In proof of this, allusion need only be made to some statements connected with the proceedings associated with the confession of malfeasance by Henry Corbet Jones, the ex-Town Clerk of Holborn. He was, as a servant of the Borough Council, paid a salary which was to include all work done by him; and it was stipulated that any fees

he received were to be the property of the Council. The reports of the hearing at Bow Street show that he habitually violated the terms of his engagement. From one report, the following sentences are extracted; and upon them no comment need be made.

Throughout 1902 and 1903, the Parliamentary Agents for the Holborn Borough Council were paid large sums for their services. Those sums were paid in full, but Mr. Jones received back from them, by way of allowance or commission, £116 13s. 6d., which, of course, belonged to the Council. The fact that he received those sums was carefully concealed from the Council; and Mr. Jones appropriated the money to his own use.

The Managing Clerk to the Parliamentary Agents gave evidence as to the payments made by the firm, by way of commission to the prisoner.

He said it was the practice to deduct from the amount received from the Holborn Council all out-of-pocket expenses *plus* 5 per cent., and to give Mr. Jones one-third of the balance. In cross-examination, the witness said that it was the ordinary percentage. The commission was intended for Mr. Jones personally, and was quite a voluntary payment. The practice had existed for seventeen years.

A little later, Counsel for the defence said—

He was sure the magistrate would keep an open mind as to what had been stated about the payments made to Mr. Jones by the Parliamentary Agents, and also about the other sums which were voted to him.

Everybody will keep an "open mind;" but there is the evidence of the Managing Clerk that the practice of giving commissions has existed for seventeen years, and that the commission was intended for Mr. Jones personally.

Mutual Satisfaction.

It may be impossible to please everybody; but it seems that the Earl's Court Gas Exhibition has afforded satisfaction to more people than could have been anticipated by the promoters in their wildest dreams. That everyone interested in the gas industry was highly gratified with the display has long been known; but now we are given to understand that the electricians, too, are delighted. Speaking at a meeting of the Society of Architects a few days since, Mr. E. T. Ruthven Murray said (as will be seen from our report of the proceedings which appears in another column) that the exhibition was about the most magnificent advertisement that was ever given to electric lighting; his explanation being that anyone who was there for two or three hours went away feeling ill. If the visitor happened to be an electrician, it is quite easy to understand his "going away feeling ill," for there was there amply sufficient to upset him. But, of course, this was not what Mr. Murray meant. All that can be said on the matter is that if those interested in the electrical industry have derived satisfaction from the exhibition, they must be remarkably easy to please; and no gas man will be ungenerous enough to begrudge the "magnificent advertisement" which has thus been accorded their wares—without any charge whatever to them. In dealing with the points raised at the meeting referred to, Mr. Murray made an able defence of electricity; but even he was compelled to admit that the ordinary naked arc lamp is weak in its penetrative power in fog—as contended by the author of the paper, Mr. B. R. Tucker. Other speakers were of the same opinion; and altogether the arc lamp came in for a considerable amount of criticism. The gas industry is, of course, to a considerable extent dependent upon the good opinion of architects; and so far as one can judge from the remarks of the members of this particular Society, and the statements made by Mr. Tucker in his very able contribution, gas stands high in the estimation of the profession. Even the President, who comes from Liverpool—a city where the electric light undertaking is owned by the ratepayers and the gas-works are the property of a Company—has satisfied himself that for shops, &c., incandescent gas is superior to the electric light. Certainly electricity would appear to stand in need of a "magnificent advertisement" of some kind or another.

An Anonymous Critic.

That wretched little question which has been raised in two or three directions with regard to the expenses incurred by gas-works administrators in attending the Earl's Court Exhibition has at last reached the bottom rung of the ladder—it has been pressed into service to form part of an attack on the Directors of the Durham Gas Company through the medium of an anonymous letter in the local Press. Now we may hope it will die an ignominious death. The nameless correspondent referred to loudly praises the pluck of the shareholder who introduced the subject at the meeting of the Company, but evidently feels unequal to fully emulating his example. That gentleman did at least stand up and say what he had to say to the faces of the Directors; while his follower prefers to make his attack unseen. Their anonymous friend cannot understand why the Directors should take upon themselves the trouble and expense to go to London to visit the exhibition without first calling a shareholders' meeting (and presumably asking for permission to make the journey)! Really, it is a pity that anyone having the ability (and leisure) to write a letter to the Press containing so excellent a suggestion should be such a victim to modesty as to refuse to divulge his identity. After this his repetition of the dear old statement that the visit was "a little outing" pales into insignificance. It is not to be assumed that the exhibition affair is the only matter about which "One who Pays" busies himself; he deals with various other questions of quite equal importance. The whole letter is, however, of so paltry a nature that it would have been deemed unworthy of notice by us (as it will probably be by the Board themselves) had it not been for the fact that we have already on several occasions felt called upon to draw attention to the foolishness of the objections that have been raised—in but very few quarters, be it remarked—to Gas Directors and Committeemen taking advantage of the opportunity, perhaps of a lifetime, which lately presented itself of seeing all that was worth inspection in the way of up-to-date gas appliances.

Local Taxation Returns.

There has just been published the final part of the thirty-third annual local taxation returns issued by the Local Government Board respecting the accounts of the various local authorities of England and Wales. The accounts to which the volume relates are those for the year 1902-3, which in the majority of cases ended either on the 25th or the 31st of March. From the introductory remarks, we learn that the sums received by the local authorities in England and Wales during the year named amounted to £129,206,784, and the sums expended to £128,968,743. The corresponding sums for the preceding year were £121,554,966 received, and £121,239,955 expended. The sum of £50,328,412, or 39 per cent. of the total receipts, was derived from public rates; £12,782,803, or 9·9 per cent., from local taxation duties and Government grants and other receipts from Imperial funds; £17,032,339, or 13·2 per cent., from revenue produced by water, gas, electricity, and tramway undertakings; while £35,271,367, or 27·3 per cent., of the total receipts was borrowed. Of the expenditure, £20,287,264, or 15·7 per cent., was devoted to the repayment of borrowed moneys and the payment of interest thereon. The outstanding loans of the local authorities amounted at the end of the year 1902-3 to £370,607,493, of which upwards of £175,395,698, or 47·3 per cent., had been borrowed for the purposes of undertakings which are or may be reproductive—gas and water works being classed among these. The amount standing to the credit of sinking and other funds was £13,401,758. The rateable value of England and Wales at the commencement of the year 1902-3 was, for poor-rate purposes, £191,106,528. Calculated on this basis, the average rate in the pound of the public rates raised during the year was 5s. 7·4d. in respect of houses and other properties assessable in proportion to full rateable value. Calculated on the basis of estimated population, the average amount of the public rates raised was £1 10s. 6d. per head. The corresponding averages for the year 1901-2 were 5s. 3·8d. and £1 8s. 6d. respectively—showing increases of 3·6d. and 2s. With regard to the Metropolis, the rateable value of the Administrative County of London, according to the valuation lists in force on April 6, 1902, was £40,677,589, including £21,964, the rateable value of agricultural land. The corresponding assessable value—*i.e.*, the total rateable value reduced by one-half the rateable value of agricultural land—was £40,666,607.

In the notice of the late Mr. Alexander Smith which appeared in the "JOURNAL" last week, it should have been stated that it was West's rope-driven stoking machinery that he introduced at the Aberdeen Gas-Works.

WATER AFFAIRS.

The Prospect of Another Dry Year.

THE reports which are reaching us from all parts of the country furnish evidence of a shortage of water which, if not relieved by early copious rains, may seriously affect the supplies of a number of the large towns during the coming summer. As already mentioned in the "JOURNAL," Leicester is some 720 million gallons to the bad—the reservoirs, which are usually full at this time of the year, being half empty; while those of the Newcastle and Gateshead Water Company are in a worse condition to the extent of something like 100 million gallons. Another Company not very far off—the Weardale and Consett—have had to curtail their supply of water since last October; and those of their consumers who are engaged in manufacturing operations are now only able to obtain one-half their usual quantity. In the area of the Cleveland Water Company there has been an extremely scanty supply for several months; the higher portions of the district necessarily suffering most. At Barnard Castle, Shipley, and Middlewich the problem of keeping up the water supply is having serious consideration. Even at Sheffield, where the inhabitants have had an uninterrupted constant service since its introduction in 1869, the Water Department have had to announce that there is only sufficient water in the reservoirs to serve the town for a limited number of days; while at Huddersfield there are nearly 450 million gallons less in store than there were this time last year. From the West of England, as well as from the Midlands and the North, very much the same state of things is reported. At Bath, a restriction of the supply is in contemplation—an almost unprecedented step on the part of the Local Authority so early in the year as February. In Central and West Somerset, large numbers of the wells in several districts are quite dry; and some of the inhabitants have to go nearly half a mile to obtain water for drinking purposes. At Taunton, the water is on from 6 a.m. to 7 p.m. only; and the quantity in the reservoirs does not justify any extension.

The foregoing is a bare outline of the position, which, of course, is due to the exceptionally dry weather of the present year following a period during which there was less than the average quantity of rain. If we go to probably the best authority on this important subject—Dr. Hugh R. Mill, who has succeeded the late Mr. G. J. Symons as keeper of the records of the British Rainfall Organization at Camden Square—we find that last year, taking the British Isles altogether, there was a deficiency of 8 per cent. Thunderstorms as well as cyclonic storms were less frequent than usual; and it is these rather than the showers that replenish the springs. This year, in all parts of the United Kingdom except the North of Scotland there has been a falling off in the quantity of rain. The records of the Meteorological Office from Jan. 1 to the 11th inst. show that in the Midlands the deficiency amounted to 1·9 inches, in the South of England to 2·1 inches, and in the South-West to 3·6 inches. These figures indicate that we have begun the year badly. Unless some heavy falls of rain occur before the end of April, the prospect will not be a very pleasant one for those who are responsible for maintaining a supply of water.

Dr. Mill thinks it is rather too early yet to discuss the bearing of the dryness of last year on the theory of cycles of wet and dry years; but he says it is evident that the wet spell which has been so long expected has not yet arrived. He points out that since 1888 there has been no exception to the regular recurrence of a wet year being followed by two dry ones; and the sixth of these consecutive groups will be completed if the present year should prove to be dry. Consequently, he would not be surprised at this year being dry and the next one wet; but he confesses that he cannot base this feeling upon anything more substantial than a succession of phenomena which seems to be not unlike a "run of luck" in games of chance, which is sure to break down if trusted too far. Of course, there is yet time for a considerable fall of rain to compensate for the past scarcity; and the sudden heavy showers that occurred in London on Sunday encourage the hope that we may have it. Meanwhile, those who are feeling the effects of the dry weather—happily we are not doing so in London, owing to the extent of our storage—have done well to husband their resources as much as possible, by calling upon the consumers to exercise care to prevent waste.

GAS UNDERTAKINGS RETURNS.

THE returns relating to the gas undertakings of the United Kingdom for the year ending Dec. 31, 1903, in the case of the Companies, and March 25, 1904, for the Local Authorities, were issued yesterday.

Particulars are furnished this year in regard to 719 gas undertakings, compared with 710 before. The new-comers among the Companies are the Brading Harbour, Burgess Hill, Conisbrough, Hailsham, Market Drayton, Wadhurst and District, and Wexford; those on the Local Authorities' list being Cudworth, Ballymena, and Strabane. The total number of Companies is 459 and of Local Authorities 260. The amount of capital authorized for the 719 undertakings (including other purposes than gas supply in certain cases) is £138,213,333, of which £117,972,458 has been paid up and borrowed. The total receipts are: Companies, £17,756,626; Local Authorities, £9,819,685—total, £27,576,311.

The statistics relating to working show that 14,201,836 tons of coal were carbonized; the number of cubic feet of gas made being 164,207,842,775 cubic feet, of which 151,677,693,467 cubic feet were sold, inclusive of 17,906,747,798 cubic feet of water gas and 86,600 cubic feet of acetylene gas. The totals in the preceding returns were: Coals, 14,109,219 tons; gas made, 160,578,787,290 cubic feet, of which 147,732,584,030 cubic feet were sold, inclusive of 16,867,649,442 cubic feet of water gas and 84,287 cubic feet of acetylene gas. The extended use of water gas is shown by the following figures in the totals of the gas sold by the Companies during the past six years. In 1898, it was 5,125,804,000 cubic feet; in 1899, 7,121,198,000 cubic feet; in 1900, 8,945,670,000 cubic feet; in 1901, 11,410,279,000 cubic feet; in 1902, 12,407,734,000 cubic feet; and in 1903, 13,056,741,000 cubic feet. The figures for the Local Authorities are: In 1898-9, 2,278,390,000 cubic feet; in 1899-1900, 2,955,828,000 cubic feet; in 1900-1, 3,162,782,000 cubic feet; in 1901-2, 3,955,621,000 cubic feet; in 1902-3, 4,459,916,000 cubic feet; and in 1903-4, 4,850,007,000 cubic feet.

At the date to which the last returns were made up, there were 30,026 miles of mains in use to supply 4,331,125 consumers and 636,671 public lamps. The preceding figures were: Miles of mains, 29,144; consumers, 4,168,725; public lamps, 628,136.

As in previous returns, particulars are furnished regarding the nature and quantity of materials other than coal used for the manufacture of gas, the supply of water gas, and the maximum proportion of its admixture with coal gas. The extent to which oil, petroleum spirit, carburine, or "other material" is being utilized for the production of gas will be seen from the following list of Companies and Local Authorities who make returns:—

Companies.

Aldershot.
Alliance and Dublin.
Alton.
Bath.
Bexhill.
Bournemouth.
Brentford.
Bridlington.
Brighton and Hove.
Bristol.
Canterbury.
Catcham.
Cleethorpes.
Coatbridge.
Colchester.
Commercial.
Croydon.
Crystal Palace (S. Sub-
Dartford. [urban.
Derby.
Dorking.
Dover.
Durham.
Eastbourne.
Epsom and Ewell.
Exeter.
Falmouth.
Fareham.
Faversham.
Folkestone.
Gaslight and Coke.
Godalming.
Gosport.
Gravesend.
Great Marlow.
Great Yarmouth.
Guildford.
Halesowen.
Harrow.
Hartlepool.
Hastings.
Hornsey.
Horsham.
Hull (British Co.).
Huyton and Roby.
Ilford.
Isle of Thanet.
Kingston-on-Thames.
Lea Bridge.
Littleborough.
Liverpool.
Maidenhead.
Malton.
Merthyr Tydfil.
Mid Kent.
Mitcham and Wimble-
Musselburgh. [don.
Newcastle-upon-Tyne.
Newport (Mon.).
Northfleet.
North Middlesex.
Norwich (British Co.).
Plymouth.
Portsea Island.
Prescot.
Preston.
Redhill.
Richmond.
Rochester.
Romford.
Rushden and Higham Ferrers.
Scarborough.
Shrewsbury.
Southampton.
Southend.
Southgate and District.
South Shields.
Staines and Egham.
Stretford.
Swansea.
Swindon.
Taunton.
Tonbridge.
Tottenham.
Tunbridge Wells.
Tynemouth.
Waltham Abbey.
Wandsworth and Putney.
Watford.
West Ham.
Winchester.
York.

Local Authorities.

Accrington.
Arbroath.
Ashburton.
Alloa.
Alva.
Barrow-in-Furness.
Belfast.
Birkenhead.
Birmingham.
Blackburn.
Blackpool.
Broughty Ferry.
Burnley.
Bury.
Carlisle.
Chorley.
Coventry.
Darlington.
Darwen.
Dumfries.
Dundee.
Dunfermline.
Edinburgh.
Glasgow.
Greenock.
Halifax.
Hebden Bridge.
Helensburgh.
Hereford.
Heywood.
Ilkeston.
Keighley.
Kilsyth.
Leeds.
Leek.
Leicester.
Leigh.
Lincoln.
Llandudno.
Longton.
Loughborough.
Manchester.
Middlesbrough.
Middleton.
Oldbury.
Oldham.
Paisley.
Peebles.
Perth.
Portland.
Portsoy (acet. gas).
Ripon.
Rochdale.
St. Helens.
Smethwick.
Southport.
Stafford.
Stockport.
Stockton-on-Tees.
Tipton.
Todmorden.
Torquay (St. Mary Ch.).
Walsall.
Warrington.
West Bromwich.
Wigan.

The new names in the above lists are the Aldershot, Littleborough, Merthyr, Mitcham and Wimbledon, and Rushden and Higham Ferrers. On the other hand, the Chigwell, Longwood, and Maidstone Companies drop out. The Gas Commissioners of Portsoy used 10 tons of carbide of calcium in the manufacture of 110,000 cubic feet of acetylene gas, of which 67,300 cubic feet were employed for private and 19,300 cubic feet for public lighting—together 86,600 cubic feet, at the price of 6s. per 100 cubic feet.

With regard to carburetted water gas, the returns show that when they were made up it was being supplied by the following Local Authorities and Companies; the maximum proportions of its admixture with coal gas (except where averages are stated) being given in parentheses:—

Local Authorities.

Accrington (20).	Halifax (30·34).	Paisley (2·31).
Barrow-in-Furness (24).	Hebden Bridge (20†).	Smethwick (not stated).
Belfast (52·35).	Leeds (not stated).	Southport (51·38).
Birkenhead (33·5*).	Leicester (10).	Stafford (15·9).
Birmingham (25).	Lincoln (33·33‡).	Stockport (25).
Blackburn (25).	Longton (6·9).	Stockton-on-Tees (19·10).
Burnley (34).	Loughborough (15).	Tipton (20).
Carlisle (27·5).	Manchester (§).	Todmorden (20).
Chorley (20).	Middlesbrough (n.s.)	West Bromwich (23 *).
Coventry (63·41*).	Oldbury (20).	
Edinburgh (7·9).	Oldham (40‖).	

*One day only. † Approximately. ‡ In the daytime; none at night. § 38·09 per cent. at the Bradford Road station; 23·25 per cent. on the total output. ‖ At one station only on one day only.

Companies.

Alliance and Dub.(av. 50).	Guildford (25 to 33‡).	Redhill (37¶).
Bath (50).	Harrow (43).	Rochester (30).
Bexhill (40·85).	Hartlepool (av. 20).	Romford (28).
Bournemouth (30).	Hastings (36·50§).	Rushden and Higham Ferrers (18·52).
Bilston (about 10).	Hornsey (40).	Scarborough (av. 23·27).
Brentford (40).	Horsham (45).	Southampton (39).
Bridlington (33).	Hull—British (40).	Southend (52·74).
Brighton (40·62).	Ilford (22·7).	Southgate and District (51)
Caterham (not stated).	Kingston-on-Thames (25).	South Suburban (36·5)
Cleethorpes (22).	Liverpool (50).	Staines and Egham (25).
Colchester (26).	Lea Bridge (about 40).	Stretford (34·73).
Commercial (35·7*).	Londonderry (30).	Swansea (not stated).
Croydon (42·93†).	Maidenhead (45).	Swindon United (33·5).
Dartford (23·4).	Malton (about 22).	Taunton (37)
Dorking (50).	Merthyr Tydfil (20).	Tonbridge (25).
Durham (25).	Mitcham (29·4)	Tottenham (52).
Eastbourne (20 to 30).	Newcastle (av. 927‖).	Tunbridge Wells (25 to 30)
Epsom (not stated).	Newport, Mon. (24).	Waltham Abbey (n.s.).
Falmouth (33·33).	North Middlesex (50·09).	Wandsworth (4 to 35·4).
Faversham (14).	Norwich—British (52).	Watford (36).
Folkestone (40).	Plymouth (40·5).	West Ham (17·4)
Gaslight and Coke.‡	Portsea Island (36).	Winchester (26).
Gosport (20).	Preston (34·8 av. for one week)	York (21·22).
Gravesend (29).		

* Average, 22·6. † For one day only; average 33 per cent. ‡ The Company supplied 4,440,956,000 cubic feet of water gas. Of the total quantity of gas sent out, 14 per cent. was unmixed with water gas. With regard to the remainder, 61 per cent. contained a maximum proportion of 26 per cent. of carburetted water gas, 13 per cent. a maximum proportion of 31 per cent, 9 per cent. a maximum proportion of 38 per cent., 7 per cent. a maximum proportion of 40 per cent., and 10 per cent. a maximum proportion of 42 per cent. §Average for the year, 28·16 per cent. ‖ For one week. Minimum average for one week, 2·72 per cent. ¶ One day only.

Five new Gas Companies—Bilston, Cleethorpes, Gravesend, Mitcham and Wimbledon, and Rushden and Higham Ferrers—appear in the above list. The new Local Authorities furnishing returns are Barrow-in-Furness, Greenock, Leek, Leigh, Portland, Walsall, and Warrington.

Comparing the figures furnished by the present returns with those contained in similar returns for the previous nine years, it will be seen that the Companies show as follows:—

Year.	Share and Premium Capital Paid up.	Loan Capital Issued.	Capital Sold under Auction Clauses.	Premiums Realized.
1894. . .	£37,059,199½	£7,739,678	£5,715,024	£2,637,019
1895. . .	37,307,330½	7,888,086	5,974,455	2,779,604
1896. . .	41,433,325	8,185,710	6,783,468	3,512,818
1897. . .	42,368,976	8,891,218	7,248,545	3,405,345
1898. . .	44,134,488	9,360,293	7,786,216	3,995,781
1899. . .	57,937,016	11,451,134	10,031,384	4,301,820
1900. . .	59,638,877	11,775,642	11,030,474	4,867,124
1901. . .	62,775,845	12,201,533	11,815,348	4,701,958
1902. . .	64,299,112	12,829,925	12,902,864	5,238,898
1903. . .	67,417,798	13,451,381	13,829,567	5,129,028

Year.	Tons of Coal Carbonized.	Cubic Feet of Gas Made.	Number of Consumers.	Public Lamps Lighted.
1894. . .	7,128,126	72,610,842,498	1,266,943	295,787
1895. . .	7,531,131	77,245,618,489	1,339,712	302,015
1896. . .	7,681,770	80,015,323,004	1,439,272	308,180
1897. . .	7,963,465	84,040,175,901	1,549,627	314,451
1898. . .	7,958,669	86,705,722,752	1,670,847	319,007
1899. . .	8,321,187	91,794,898,282	1,817,649	324,166
1900. . .	8,426,853	94,869,749,232	1,945,825	326,813
1901. . .	8,580,365	97,386,618,553	2,048,359	326,209
1902. . .	8,520,004	99,676,048,000	2,197,987	333,308
1903. . .	8,528,823	101,490,084,000*	2,385,348	335,363

* Number of cubic feet sold, 93,923,290,000, including 13,056,741,000 cubic feet of water gas.

The somewhat similar figures for the Local Authorities are—

Year.	Amount Borrowed, including Annuities (not deducting Repayments).	Receipts.	Expenditure (exclusive of Amount in the next Column).	Interest, &c., Paid.*	Net Profit after Payment of Items in preceding Column.
1894-95 .	£24,624,554	£6,402,046	£4,681,035	£1,114,014	£622,366
1895-96 .	25,624,326	6,478,191	4,881,944	1,126,170	493,886
1896-97 .	26,561,689	6,639,342	4,989,283	1,136,789	534,390
1897-98 .	27,376,324	6,759,883	5,058,705	1,161,171	554,014
1898-99 .	28,614,971	7,177,670	5,365,995	1,219,771	625,780
1899-00 .	29,658,730	8,048,089	6,155,725	1,280,168	663,189
1900-01 .	31,509,701	9,121,418	7,463,693	1,353,259	409,802
1901-02 .	34,045,442	9,300,567	7,630,856	1,467,232	414,091
1902-03 .	35,738,023	9,554,984	7,215,502	1,584,985	793,764
1903-04 .	37,103,279	9,819,685	7,182,008	1,700,405	967,194

* These figures include: (1) Interest paid on loans; (2) amount paid for annuities; (3) amount of loans repaid; (4) amount paid for redemption of annuities; (5) amount placed to sinking fund.

Year.	Tons of Coal Carbonized.	Cubic Feet of Gas Made.	Number of Consumers.	Public Lamps Lighted.
1894-95. .	4,191,175	41,684,838,142	1,257,274	217,069
1895-96. .	4,406,315	44,176,134,202	1,320,059	224,873
1896-97. .	4,614,969	47,026,280,408	1,406,456	232,464
1897-98. .	4,652,688	48,652,558,526	1,475,749	239,352
1898-99. .	4,883,148	51,441,272,030	1,578,291	247,857
1899-00. .	5,289,501	55,360,659,139	1,667,908	257,040
1900-01. .	5,479,435	57,138,062,255	1,767,464	278,343
1901-02. .	5,522,264	59,300,273,086	1,872,633	287,887
1902-03. .	5,589,215	60,902,739,000	1,970,738	294,828
1903-04. .	5,673,013	62,717,759,000*	1,945,777	301,308

* Number of cubic feet consumed, 57,754,404,000, including 4,850,007,000 cubic feet of water gas and 86,600 cubic feet of acetylene gas.

An Electrical Exhibition.—There has not been a representative electrical exhibition since 1892; and so the National Electrical Manufacturers' Association are taking the matter up with the view of holding one next autumn for five weeks at either Olympia or the Crystal Palace. A strong Committee has been formed to take preliminary steps; and several important firms have already promised their support. The Gas Exhibition was a fine booster in more senses than one.

Gas-Engine Development.—In "Technics" this month, there is an article by Mr. Thomas Holgate on "Recent Gas and Oil Engine Developments." In the opening paragraph, he says: "Most of the engines exhibited at Earl's Court were of the single-cylinder horizontal type. They showed that development is proceeding along the lines (*a*) of higher compression of the charge before ignition; (*b*) of employing electric ignition in lieu of tubular; (*c*) more convenient means of starting; (*d*) in large engines, of water cooling for the exhaust-valves. These advances in recent years, combined with better governing, have brought about considerable reduction in the cost of gas for working, and increased satisfaction in the uniformity of power generation."

Storm-Proof Lanterns for Incandescent Street Lighting.—Writing on the subject of the benefits that are to be derived from the use of storm-proof lanterns in connection with incandescent gas lighting, Mr. H. Kendrick, of Stretford, gives the following particulars in regard to the three types of lantern in use in his district: (1) Wind-proof lantern, fitted with ball trap and A.V.I.L. frames, no flash-light, lighted by the Simmance and Abady torch, 2·7 mantles per lamp per annum. (2) Ordinary type of lantern, not wind-proof, fitted with ball trap and A.V.I.L. frame, no flash-light, lighted by torch as in No. 1, 6·2 mantles per lamp per annum. (3) Ordinary type of lantern, not wind-proof, some with swing doors, some with ordinary flap in bottom, no flash-light, lighted with ordinary torch, with hood attached to side, burners fitted with spring anti-vibrator, 12·6 per lamp per annum. In the case of No. 1, the lamps are lighted and maintained by the Gas Company; in Nos. 2 and 3, they are lighted by the Council and maintained by the Company.

The Mechanical Engineering of Collieries.—We have received from the "Colliery Guardian" Company, Limited, of Furnival Street, E.C., an advance copy of the first volume of an entirely new work on the above subject specially written for their paper. The latest edition of the standard book upon it—that by Percy—having been exhausted, arrangements were made with him to re-write his work; but this was prevented by his death. Mr. T. Campbell Futers was then asked to contribute to our contemporary a series of up-to-date articles; and they are in course of publication. It is the first section of them which is now being issued in book form. In the four chapters into which the contents are divided, the author deals with boring, shaft sinking, surface arrangements, and shafts and headgears; and the text is fully illustrated by diagrams and plates. The book appears at a very opportune time, in view of the stress which has been laid by the Royal Commission upon the necessity for employing the most perfect machinery and appliances in the production of coal, in order to enable England to compete with foreign countries; and we trust the enterprise of the publishers in bringing it out will be amply rewarded.

PRESENTATION TO MR. JAMES W. HELPS.

A Token of the Esteem of the Exhibitors at Earl's Court.

UNDER the circumstances indicated in a paragraph appearing elsewhere, and headed "Honour for Mr. James W. Helps," that gentleman was the guest, last Thursday evening at the Holborn Restaurant, of a number of the exhibitors at the late Earl's Court Gas Exhibition; the occasion having been arranged as the setting to a presentation of a piano to Mr. Helps to commemorate that highly successful event, to show the personal esteem of the exhibitors for him, and to form a perpetual reminder of how much they appreciated his efforts and labour on their behalf as the chief working representative of the gas profession at the exhibition. Mr. Charles Clare, the Chairman of the Exhibitors' Committee, presided; and on his right was the guest of the evening and Mr. Fred West, and on his left Mr. Joseph Hepworth and Mr. John Glover. Altogether there were probably fifty at the dinner; and it was certainly one of the most enjoyable of social events. The idea of a presentation to Mr. Helps was as spontaneous on the part of, as it was heartily taken up by, the exhibitors. While Mr. Helps set himself firmly against any idea of reward for his work, the exhibitors were not to be denied their purpose; and a compromise was effected by the restriction of the contributions so that the gift should be regarded entirely as an evidence of the goodwill of the donors. However, the piano was present at the dinner; and being symbolical of harmony and goodwill, it was only in accordance with the fitness of things that it should, and it did, to the delight of all present, take a most harmonious part in the proceedings. The piano is a small upright grand Bechstein, in walnut case, with stool to match. Inside the cover is affixed a silver plate, on which is engraved: "Presented to J. W. Helps, Esq., M.Inst.C.E., as a mark of esteem from the Exhibitors of the International Gas Exhibition at Earl's Court, London. 11th December, 1904."

After dinner, there was the loyal toast, and then Mr. Clare gave "The Guest of the Evening." He spoke of the exhibition as having centred round Mr. Helps, whose energy before the opening and throughout was unbounded. Another point in the Chairman's speech was the indication of his opinion that it was not likely there would be another gas exhibition on such a magnificent scale for many years to come, unless financial assistance could be rendered to the exhibitors. In regard to the presentation, he looked upon Mr. Helps's choice of a piano as a very happy one, because it was an emblem of energy and harmony. In asking Mr. Helps to accept the piano, he expressed the hope that that gentleman would live for many years to have before him this memento of the esteem the exhibitors felt for him, and of the work which he did for them. Mr. Fred. West and Mr. John Glover also spoke. In the course of his acknowledgment, Mr. Helps also referred to the harmony which existed at Earl's Court, and of the grand co-operation of the exhibitors in doing everything possible to promote the success of the exhibition. He also observed that a common expression on such occasions as the present was: "This is the proudest moment of my life;" and if ever a man was justified in using that expression, he was on this occasion. He further assured his hearers that, if there was any way in his power by which he could further their interests, individually or collectively, he should be pleased. His concluding words were, when he was no longer able to take an active part in this great gas industry, when his life began to draw to a close, he hoped that then he might feel he had done nothing to forfeit his right to say with Longfellow—

> Something attempted, something done,
> Has earn'd a night's repose.

Mr. Helps was enthusiastically cheered.

Then there was another pleasant incident. Mr. W. Edgar proposed the health of Mr. Clare, and asked his acceptance from those present of a silver inkstand as a small memento of his work in connection with his chairmanship of the Exhibitors' Committee. In speaking to the toast, Mr. F. Tilley made allusion to the meeting that afternoon to discuss the question of the formation of an Institution of Gas-Works Contractors and Manufacturers, and referred to the occasion as having seen the birth of such a body (see p. 475). In a response, composed of much wit and wisdom, Mr. Clare expressed his thanks, and assured those present that anything he could do to further their mutual interests and the interests of the gas industry, would give him satisfaction.

This is a sufficient account of the occasion to show that it was replete with pleasure and interest.

Manchester District Institution of Gas Engineers.—The thirty-fifth annual meeting of the Manchester District Institution of Gas Engineers will be held next Saturday, when the President-Elect (Mr. S. Meunier, of Stockport) will deliver his Inaugural Address, and Mr. R. Watson, of Doncaster, will read a paper on "Some Street Lighting Results." Other matters for consideration are reports of the Commercial Sections, a proposal to initiate a Question-Box, and the suggested Gas Exhibition in Manchester; while, of course, the report of the Committee and statement of accounts will be submitted. There will also, in connection with the affiliation with the Institution of Gas Engineers, be the election of the District Member of the Council.

THE GAS STOCK AND SHARE MARKET.

(For Stock and Share List, see p. 512.)

ALL the favourable features which characterized the Stock Exchange in the week before last continued in full force during the week just closed. The firm demand for securities of high class for investment was maintained and intensified; and prices steadily hardened. Not even the inevitable realizing to secure profits, which always follows a marked rise, and which most usually is a feature of every Friday, could do more than momentarily check the rate of progress; and the upward tendency continues strong. The Money Market was, of course, easy; and in some quarters impatience is manifested at the Bank rate not having fallen. However, they may not have to wait long. Business in the Gas Market was brisk and good, though sometimes rather irregular. On one day, it would start off at a tremendous rate, and the next it would quiet down to very tame dealings. But the general tone all round was excellent; and a fair number of issues have made moderate advances in value. In Gaslight and Coke, the ordinary was active and steady; the bulk of the transactions marked being at par. The lowest figures were $99\frac{5}{8}$, and the highest $100\frac{1}{4}$. The secured issues were active and buoyant; and the advance which we thought might well have come a week ago really did come at last. The maximum was done at $91\frac{3}{4}$; the debenture at from $88\frac{1}{8}$ to 90; and the preference, after being let go at $109\frac{1}{8}$, changed hands more than once as high as 112. South Metropolitan fell very quiet, with not half-a-dozen dealings, which ranged from $127\frac{1}{2}$ to $128\frac{1}{2}$. The debenture rose a point, but was not dealt in. In Commercials, there were a few transactions in the 4 per cent. stock at 119 and $119\frac{1}{2}$, but the other issues were not touched. The Suburban and Provincial group were strong, but showed no increase in activity. Alliance and Dublin new marked $14\frac{3}{4}$, Bournemouth preference $16\frac{1}{4}$, and British $41\frac{3}{4}$. Brentford old realized 255, and ditto debenture $106\frac{1}{2}$. North Middlesex 7 per cent. was done at $14\frac{3}{16}$. In Tottenham "A," there were dealings at 127 and 128, and ditto "B" was done at 101. West Ham preference changed hands at 126. In the Provinces, Liverpool "B" advanced a point; but Newcastle had a fractional set-back. The Continental Companies were very quiet. Imperial was stronger, at an advance of a point—marking from $211\frac{1}{2}$ to 213; and ditto debenture also rose, with business done at $96\frac{3}{4}$ and 97. Union was done at from $118\frac{1}{4}$ to 119. There were no transactions in European. Tuscan shares marked $9\frac{1}{8}$, and ditto debenture had a smart advance, with one transaction at $99\frac{1}{4}$. Among the undertakings in the remoter world, Bombay old was done at $6\frac{3}{8}$ and $6\frac{5}{8}$, and Oriental at $149\frac{1}{2}$. Buenos Ayres was done at $11\frac{7}{8}$, River Plate at $12\frac{9}{16}$, and Monte Video at $10\frac{3}{4}$. Primitiva ordinary had a renewed outbreak of activity, and was done several times at prices ranging from $5\frac{9}{16}$ to $5\frac{3}{4}$. The preference also was brisk, with dealings at from $4\frac{13}{16}$ to $4\frac{15}{16}$.

Proposed Gas Association for Wales.

Mr. Octavius Thomas, the Engineer and Manager of the Rhondda Gas and Water Works, has lately put himself in communication with his *confrères*, with the satisfactory result that he has obtained promises from over forty gas managers to join a Welsh Gas Association should one be started. Accordingly a meeting will be held at the Park Hotel, Cardiff, on Wednesday, the 1st prox., at 2.30, with the object of forming such an Association, appointing officers and a Committee to prepare the rules and regulations, and also to decide what meetings shall be held annually, where the first meeting shall take place, and transact any other business. Mr. Thomas will be glad to hear on the subject from any manager to whom, by inadvertence, he may not have already written.

The Luminescope.

At a recent meeting of the Society of Chemical Industry Mr. C. S. Stanford Webster described a new scientific appliance bearing the above title, the object of which is to afford a ready means of comparing different substances with regard to their "glow" and "scintillating" power under the influence of radium. The "Spinthariscope" of Sir William Crookes, which is founded on the action of the emanations of radium on zinc sulphide, is already well known. Mr. Webster's appliance is a modification of Sir William's invention. A suitable and adjustable lens is provided, by which a proper focus can be obtained. Beneath and at the side of the lens is a tube containing some radium compound capable of giving the requisite emanations to act on the material under observation. At a suitable distance in the apparatus is a disc, which can be turned at the will of the observer, and which renders it capable of placing within a brief period four slides of different substances under inspection. Rapid comparisons can therefore be made. The subject is not only interesting from an ordinary scientific point of view, but may be found of greater value when its possibilities get more known. The "glow" or "scintillation" of any particular material under the influence of the radium emanations might be able in the future to help to the recognition of special substances, in somewhat of the same way that the use of the polariscope has added to the value of the microscope.

GAS INTERESTS AND FREE-WIRING.

THE electrical contractors, represented by their Association, are, as announced in a recent issue, going to give no quarter in the conduct of the campaign against the free-wiring proposals of the London County Council, or of any other Local Authority. War to the death of the clauses is the cry. The agitation has been set moving; and already the Association have secured among Members of Parliament a promised vote of 250 hostile to the clauses when the Bill of the County Council is before the House. Under these circumstances, and because the gas industry is concerned in the matter in a twofold manner, the time will not be mis-spent in giving a little extended consideration to the question, and to examine how and in what way the various parties interested are affected by it.

There are at least four parties whose interests are antagonistic to the system of free-wiring—the ratepayers, the suppliers of gas, the contractors for electricity fittings and work, and the ordinary consumers of electricity. In some measure, the interests of these parties are identical; but there is not one of them who can swim far with the others without parting from companionship. Yet all must, if they give the question full consideration, desire the total suppression of this proposal of municipalities to break fresh ground in the hunt for business. Take, for instance, the contractors. Their chief interest is a trade one. They would not object to a municipality having the power to spend money on free-wiring, if the work was done through the contractors, and not direct by the corporation electricity department. To that extent their opposition is a selfish one; but they join forces with the gas interests when they take their stand in opposition on the ground that, as municipal operations of this character are solely speculative, they, as a ratepaying trade, are menaced in a double manner—directly through the loss of work, and indirectly through the influence of this species of municipal trading upon the rates. As a matter of fact, this is not the full scope of the injury—for, if the business is not successful, not only do they lose work, but they have to pay more towards the rates; while, if the business is successful, as Lord Claud Hamilton puts it, it is only so at the expense of the loss of business to the local trade. It is owing to these effects of electricity supply, and of this new subsidiary and doubtful expedient of raising the figures of output, that gas companies are hostile to municipal trading in these directions. Large output figures are seen to be frequently illusory as an index of success in the case of electricity supply;* and the increase of output obtained from houses into which capital has been sunk for free-wiring may never pay. All the chances are against it. It is obvious that the potentiality of the business in regard to profit is a *minus* quantity; and what business is procured by such means will in most cases, it is very certain, be dearly purchased. It is to be hoped that where free-wiring has been, or may be, permitted, that distinct accounts of the ordinary and free-wiring departments are insisted upon, in order that the profit or loss on the latter shall not be represented in the issued statements by the symbol x.

It is here that connection with the matter is made by the general ratepayers (who are not affected by the rivalry in trade) and by the ordinary electricity consumers. If the free-wiring business does not pay, both are affected—the non-electricity consuming ratepayer by having either to contribute to a losing business, or by losing a share of the profits on the undertaking which otherwise would come to him indirectly through a reduction of rates, or be utilized in his service in some other direction; the consumer of electricity in the same way, and by the inversion of his prospects, through this free-wiring business, of securing his electricity at a cheaper rate. It is argued by the advocates of municipal free-wiring that they are not risking the ratepayers' money; for the charges for current will cover all outgoings on capital outlay. The argument discloses the hazard. In the first place, where it is proposed, as in the case of the Metropolitan Borough Councils, to allow wiring for "prospective consumers," there is considerable danger of the outlay never earning anything. Then, again, where a method of lighting in comparison with other methods is already dear, as in the case of electricity, the additional sum paid for the free-wiring on the ordinary cost per unit of electricity will not be taken into account as a separate obligation by these consumers. Consumers who cannot afford to pay for the wiring and fitting up of their own houses are, it follows, of a poorer class than those who, wishful for electricity, proceed about the fitting up of their premises in the ordinary way at their own expense. It is these poor consumers to whom the enticing deception of "free" wiring is offered. The extra sum charged for the accommodation is overlooked; the lump sum charged only is considered by them. A little experience on their part will vote electricity a very dear system of lighting, compared with what can be done by another just as convenient and even more efficient system for not only lighting but other purposes which electricity cannot touch. These people, too, will pay greater consideration than the rich to the fact that, if they want the conveniences of gas for cooking and heating, they must have a duplication of their accounts for the dual service; and this will strongly affect a continuance of patronage to both. It will not be the less expensive form of lighting, not the service which offers the greatest range of conveniences, that will go to the wall. Therefore from both these points of view, it is questionable whether the consumption of the majority of these free-wired consumers will long continue to be sufficient through the extra charge—without prohibitive conditions as to minimum consumptions, or a separate rent for the fittings is imposed—to meet the capital charges on their installations. Success is imperilled from all these influences. If free-wiring is to be allowed as a recognized auxiliary of municipal electricity supply, the inducement to the adoption of the system by consumers ought, for the protection of the non-consuming ratepayers and the ordinary electricity consumers, to be surrounded by conditions which will be certain in their capital-recouping effect; or, on the other hand, the imposition of the Northumberland clauses would meet the views of the ordinary ratepayers and the large ratepaying gas suppliers. The protection of the ratepayers, however, by this latter means has an objectionable side to the ordinary consumers of electricity, in that the free-wiring business would inflict upon their interests, *qua* electricity consumers, an additional risk.

Electricians (we give them credit for this, even if they do not confess it) can understand quite well the position taken up in this matter by gas companies; and gas companies reciprocate by taking no exception to private electrical enterprises going in as strong-headed as they like for free-wiring. The position is reasonable and tenable. But then we encounter the questions, Why should municipalities be placed in a worse position by being denied free-wiring than gas companies; and why should not electric lighting companies object to gas departments encouraging what is practically a similar system in connection with gas supply—that is, through the prepayment system of fitting up houses? The "JOURNAL" is not so much interested in the defence of municipal gas policy or methods against attacks that may be made by private electrical enterprise, as it is in the defence of private gas enterprise against the unfair competition of a hazardous business propped up by the public revenue. If there is any objection to be taken to the doings of municipal gas undertakings in this respect, let private electrical enterprise make the attack. But, at the same time, we will admit the two questions as being fair matter for controversy. In the first place, excepting in the most flourishing, populous, or industrial centres, the business of electricity supply has—to the regret and distress of the ratepayers—proved itself to be radically speculative; and we have, in this article, given our reasons for believing that the hazard is even more pronounced in the free-wiring branch. No evidence acceptable or defying challenge has been advanced which proves the contrary; and if evidence is advanced, it must be from a neighbourhood which can be taken as generally representative, or it cannot be held as proved. We have it from the modern history of gas supply, that there are many localities where fitting up is done on the prepayment system, and where (this is important), notwithstanding that gas offers a cheaper light than electricity, and cooking and heating supply an outlet for business that electricity does not possess, the whole of this poorer class of consumers do not use sufficient gas to pay, through the extra price, the charges which their installations impose on the gas undertaking. If in gas supply there are these instances, how much more will they be multiplied in the case of a commodity not possessing the advantages of gas in the variety of its uses for domestic purposes, and which in its single use in the ordinary household is more expensive than gas? Under such circumstances, we are not prepared to subscribe to the proposition that the municipalities are placed in any worse position than gas companies in being denied free-wiring; the denial is, in numerous cases, more likely to have a constructive than a destructive effect on the fortunes of the undertakings. The comparison between the free-wiring business in the case of municipal electricity departments and of the prepayment gas business in municipal gas departments has really no coincidence; the element of risk in the latter being, the reasonings already presented show, infinitesimal when considered in its relation to that of the former. We appreciate, too, that not only would the ordinary customers of a municipal electricity undertaking have cause for remonstrance against the department entering upon the risks of the free-wiring business which would militate against their prospects of cheaper supply, but that the gas consumers under the same municipality would have the right to prefer an objection to the proposal, inasmuch as it would, in greater or less degree, divert business from the gas undertaking through which they have contributed so much to the rates, as well as lessen, in proportion to the progress made by the free-wiring system, their chance of further price-reductions. Moreover it increases, too, the probabilities of their having to contribute to the support of the electricity undertaking, both through the rates and the gas profits. Municipal gas consumers in such cases are tied hand and foot; and they have no one—unless the Ratepayers' Associations will take the matter up—to fight for such parliamentary decree as shall ensure that their local electricity supply undertakings are at any rate self-supporting. If regulation could be imposed to this extent, all municipal gas

* In this connection, we may quote the following passage from a paper on "Municipal Trading" read, by Mr. T. H. Tuff, at the Bartholomew Club last Tuesday: "Glasgow last year lost £13,896 on their electric lighting, Dublin £5524, Battersea £2688, Cheltenham £3740, Wigan £3194, Maidstone £3162, and 61 others show a loss of from £3000 downwards. In the two worst cases, it cannot be claimed that the undertakings are new, for Glasgow, with a loss of £13,896, has been supplying electricity for the past ten years; and Dublin, with a loss of £5524, for an equal period. Altogether 155 municipalities now provide electric light; the total capital sunk in the business being £21,983,000. The net profit last year on these 155 undertakings was £197,707, or less than 1 per cent., while 111 of these corporations placed absolutely nothing to depreciation or reserve."

consumers would no doubt be satisfied that the competition of the undertaking which they themselves patronize would show sufficient vitality to protect their interests in other respects.

This session is to see the free-wiring question contested with a degree of seriousness exceeding anything that has hitherto been done—keen though the struggle has been in former sessions; and we would admonish gas companies (municipalities are slipping clauses into their Bills wherever possible) to watch the matter very carefully, and to take action in the endeavour to protect themselves as ratepayers, and to frustrate further subsidized competition. The consideration which has been given to the subject here will, we think, convince most of our readers who are not electricians or vendors of municipally generated electricity that the arguments contra to the free-wiring system are superior to anything that can be urged in its favour.

WATER GAS IN ITALY.

THE report of the proceedings at last year's meeting of the Italian Gas Society has just been issued; and in it are some remarks by M. Pouchain, the General Manager of the Anglo-Romano Gas Company, on the subject of the water-gas plant at Rome, that may not be without interest.

The right to manufacture water gas was obtained by the Anglo-Romano Gas Company by virtue of a contract made in 1898. Two reasons led to this power being sought. The first was the difficulty experienced in selling coke; the second, the power it gave of making a large quantity of gas with a greatly reduced staff of workmen. This is a considerable advantage in view of the pretensions of the workmen, which increase from day to day. The system adopted at Rome is not the "Lowe," but one based on carburetting by means of benzol—although this method is sufficiently costly in Italy, owing to the very heavy duty on benzol, which equals about 140 per cent. of its prime cost. The plant at Rome was put up by the Société pour l'Utilisations des Gaz Industriels, of Paris; and it has a productive capacity, with three men, of 650 cubic metres per hour, or nearly 23,000 cubic feet. In the first four months of last year, 1,379,000 cubic metres (about 48,700,000 cubic feet) of water gas were produced. The coke used both in the bo lers and in the generator was about 1080 grammes per cubic metre of gas made, or 67·39 lbs. per 1000 cubic feet. The consumption of benzol was about 100 grammes, or (say) 0·623 gallon per 1000 cubic feet. The cost of labour was about 3·80 lire per cubic metre of gas made, or just over 1d. per 1000 cubic feet. The gas is put into a special holder, and is then sent into the general system of mains at a point between the retort-house and the condensers. This is done to avoid difficulties that were formerly experienced when the water gas was mixed in the hydraulic main. A drawback to the water gas is that it contains a large proportion of carbonic oxide; and for this reason its manufacture at Rome is limited to not more than 20 per cent. of the total output of gas. Another disadvantage is that its calorific power is lower than that of coal gas; but this is only of consequence as regards a few gas-engines which can be altered. The manufacture has hitherto proceeded without inconvenience of any sort.

We believe that the water-gas plant at Rome is the most important of the very few installations that have as yet been adopted in Italy. As our readers well know, there are two principal reasons which have tended, and still tend, against its introduction into that country. Perhaps the more important reason is the fact that, in many of the concessions for lighting, it is stipulated that the gas shall be coal gas only. The other reason is, as pointed out by M. Pouchain in his remarks, the excessively high customs duty that is charged on petroleum and the like. But it may now be anticipated, with the beginning made in the Italian capital, that both the restrictions mentioned may be removed, at least to some extent.

THE BLUE-GUM TREE AS A GAS PRODUCER.

WE learn from the extracts from Port Elizabeth newspapers which have been received from Mr. W. Arnott, the Manager of the South African Lighting Association, Limited, that some importance is being attached locally to a discovery which has been made that the blue-gum tree can be utilized for the production of illuminating gas. It appears that there are several large plantations of these trees on the Rand. They were grown originally to provide props for the mines; but they proved unsuitable for anything but firewood until it was found that they could be made to produce gas. Up to now the chief merit of the tree, which is a Tasmanian evergreen, has been its disinfecting properties in marshy and fever-haunted districts; and from the extraordinary power of its roots to absorb moisture, and the salutary aromatic odour of its leaves, it has been found highly beneficial in counteracting the malaria of hot climates. Its first seeds were sent from Melbourne to Paris in 1854 by M. Ramel; and subsequently they were distributed over the South of Europe, throughout Africa, and elsewhere. So rapid is the growth of this tree, that it is said a forest may be formed in twenty years. It sometimes reaches the height of 350 feet with a circumference of 100 feet. In South Africa it has been found to flourish exceedingly well under varied climatic conditions, and a well-grown tree can be produced in three years. A firm at Johannesburg, where coal gas is 19s. per 1000 cubic feet, have put down a small plant, consisting of a retort, condenser and purifier, and holder, equal to making gas for about ten lights. They are trying to "boom" the gas, which is stated in one of the papers to be "far cheaper and less dangerous than electricity," while giving a better light. The manufacturing process is reported to be "exceedingly inexpensive and simple;" and the bye-products alone will, it is estimated, "defray the cost of production." This, of course, will have to be proved. As a matter of fact, the gas in itself is non-luminous; but it gives a good light when used with a Welsbach incandescent burner. The residual product is charcoal, which fetches a good price, and would, we understand, pay to make, apart from the gas. The wood sells on the Johannesburg market at 12s. 6d. per ton; and this quality yields 8000 cubic feet of gas and 8 gallons of tar. The price of charcoal is about £2 per ton. We shall await with interest some further particulars concerning this gas-making process, which does not seem to have been protected by patent.

THE SCIENTIFIC ASPECT OF WATER-FINDING.

IN the last number of the "JOURNAL," we brought our review of the correspondence which has been going on in "The Times" on the mysteries of "dowsing," or water-finding, down to the point of recognizing the possession by certain persons of a power which enables them to locate, with remarkable accuracy, the existence of sources of underground streams or springs. There remained to consider the scientific aspect of the subject; and this it is proposed to do in the present article. Before entering upon it, however, it may be of interest to point out that the divining-rod is not a thing of yesterday. The "finding-stick" and "*virgula divina*" are ancient institutions dating from the times of Ezekiel and Hosea; and almost every ancient nation practised divination, not for water merely, by means of rods. In "Sheppard's Epigrams" (1651), as shown in "Hone's Year Book," under the date Dec. 30, 1832, there is a stanza, having the heading of "*Virgula Divina*," which runs—

> "Some sorcerers do boast they have a rod,
> Gather'd with vowes and sacrifice,
> And, borne about, will strangely nod
> To hidden treasure where it lies."

Here the writer evidently has in his mind veins of precious metal. But the divining-rod was reputed to possess the power of finding criminals of all sorts, lost or stolen property, and even the boundary lines of estates, where the stones marking them had fallen down and been buried in the earth. In the Eighteenth Century, the power of the divining-rod to perform these feats was firmly believed in, as is evident from the account of the "*baguette*" given in the "*Superstitions Anciennes et Modernes*," published in Amsterdam in 1733. It is probable that the belief in the capabilities of the rod gradually declined with the advance of knowledge; and therefore it is not surprising to find that, after an interval of 120 years from the date of the issue of the above-named work, the French Academy of Sciences thought the subject of water-divining called for systematic investigation. A Commission was appointed, consisting of MM. Chevreul, Boussingault, and Babinet, to examine a *mémoire* presented by M. Riondet on the *baguette divinatoire* employed in seeking for underground water. These gentlemen duly completed their investigations, and the results were embodied in a report which M. Chevreul was authorized to present, and which concluded with the enunciation of the opinion, based upon ocular demonstration, that the movement of the twig was caused by something belonging to the moral rather than to the physical world; in other words, that the operator, consciously or unconsciously, does all that is done himself, and that neither water nor electricity has anything to do with it. These remarks serve to bring to our readers' notice the most complete investigation into the subject of water-finding ever undertaken in this country—indeed, we may safely say in Europe—viz., that of Professor Barrett, F.R.S., to which reference has already been made. His inquiry was conducted under the auspices of the Society for Psychical Research, and his voluminous reports will be found in their "Proceedings" for 1897 and 1900. Readers who are specially interested in the subject will do well to peruse these reports, with the appendices thereto, and the further report which we understand has since been issued. Here we shall only deal with Professor Barrett's contributions to the discussion in "The Times."

Considering first the divers uses to which the divining-rod was put in bygone days, especially in the South of France—its powers being invoked even for the discovery of the fathers of foundlings—Professor Barrett thinks it is obvious that those who claim that some mysterious electrical or other physical action is produced by underground water upon a forked twig, or even upon the "dowser" himself, will have to extend this action to a bewildering variety of objects; and when this is done, the absurdity of any physical hypothesis becomes apparent. Is there, then,

anything to explain, beyond chance coincidence or "an eye for the ground," the success achieved by expert water-finders? At first Professor Barrett thought there was not—indeed, he held this opinion somewhat strenuously. But when he came to look into the mass of collected evidence in possession of the Society already named, he had to relax it very considerably. He found himself face to face with what he justly calls "a most troublesome and entangled set of phenomena." The undertaking of the investigation of these caused him to put this very practical question: Where underground fissure water exists, can the "dowser" locate its position, or are his successes only such as may be ascribed to chance coincidence or a knowledge of the locality coupled with a keen "eye for the ground"? His investigation led him to the conclusion that a good water-finder has a record of successes in localities where no local knowledge or skilled observation would avail, "far beyond any explanation on the ground of chance coincidence." Of course, Professor Barrett recognizes, as we did in the opening paragraph of the second article, that "dowsers" would not be careful to record their failures; and he freely admits that many may have escaped him. However, making a liberal allowance for these, he has no hesitation in saying that, where fissure water exists, and the discovery of underground water sufficient for a domestic supply is a matter of the utmost difficulty, "the chances of success with a good 'dowser' far exceed mere lucky hits or the success obtained by the most skilful observer, even with full knowledge of the local geology." The grounds upon which this opinion is based, and the possible explanation of the operator's success, he next proceeds to consider.

Before doing this, however, he selects, from the mass of evidence in his possession, three cases in which the success of the "dowsers" concerned cannot be explained either by chance coincidence or the detection of surface signs of water. The first, and the most remarkable, was at Waterford, where the proprietors of a large bacon factory had, under the best professional advice, based on geological knowledge, made four unsuccessful borings for water, at a total cost of £1324. On the advice of one of the partners, the services of a well-known water-finder, since deceased, were sought. He had never been in that part of Ireland before, and was not allowed to hold communication with anyone, nor did he ask any questions. He walked over the premises, and marked four places at which he said water would be found. At one of these, not 17 yards from a useless borehole, he stated that water would be reached at a depth of about 80 feet. A boring was made through 41 feet of boulder and 39 feet of clay slate, when the hard silurian rock was struck, and a rush of water followed. The yield from this source has been from 3000 to 5000 gallons per hour, without a single failure, from the time of the operations to the present—a period of fifteen years. The second case was on an estate near Horsham, the proprietor of which was exceptionally well placed for obtaining the best professional advice in regard to the sinking of wells. The same "dowser" was called in, and, although a perfect stranger to the ground, he indicated two spots where water could be found at a depth of "not more than 15 feet from the surface." Wells were sunk, the borings passing through sand and a hard sandstone, and a copious supply of pure water was obtained at less than the depth named. If the "dowser" had "an eye for the ground," and detected this particular water-bearing region, all covered as it was with vegetation, "how was it," asks Professor Barrett, "that this sandstone cap escaped the more learned eye of Science?" The third case occurred in County Wicklow, where the difficulty of obtaining water, except in certain spots, afforded a good test of the powers of the "dowser"—the rock formation being quartzite and slate. The experiment was carried out under Professor Barrett's personal supervision by a water-finder from England. He was asked to mark three spots, at two of which water could be found, but not at the third. He did so, though to the eye there did not appear to be the least scientific reason for his selection. Before boring was commenced, the opinion of another "dowser," who knew nothing about the sites chosen, was sought, and it corresponded very closely with that previously given. The work was then started, and the results were exactly as predicted—water being found in two places only. "Here," says the Professor, neither surface signs nor lucky hits seem capable of explaining the man's success." He adds that out of 200 cases which he has investigated, the failures have not exceeded 10 per cent.

Now, if the alleged claims of the water-finder to a special faculty, or even facility, for locating it are based upon good evidence, what is the explanation? This is the question to the solution of which Professor Barrett next applies himself. He thinks there can be no doubt that, in some cases, "conscious or sub-conscious detection of surface indications plays an important part." But some excellent water-finders are mere children; and all the best, according to the old writers, have been "simple-minded, ignorant men—children of Nature." Consequently, they are not likely to have had a very wide knowledge of "surface signs;" and "lucky hits" are an equally improbable explanation. Professor Barrett dismisses alike Sir William Preece's "vibration" theory and Mr. Gregory's suggestion of "hygrometric sensibility;" while as to electricity or magnetism, he finds, from actual experience, that "dowsers" are "not a whit more sensitive to any electric, magnetic, or radio-active influence than ordinary mortals." Nor is the explanation to be found in any peculiarity of the forked twig or other indicator, seeing that some water-finders trust to their sensations alone. He points out that the involuntary power of working the rod is possessed by many more persons than is suspected. They have an idiosyncrasy which manifests itself in slight, involuntary, and sub-conscious muscular movement. What stimulates this movement? According to Professor Barrett, it may be derived from "a dormant idea or sub-conscious suggestion in the person's own mind, or from some impression derived from an external object or an external mind;" in other words, the exciting cause may be within or outside the person. Therefore, to infer that the twisting of the rod is necessarily due to an external object like underground water or a metallic vein, is, he declares, "contrary to fact." Yet he tells us that this false inference is invariably drawn by every "dowser," who thereby often leads the credulous into costly mistakes. The twisting of the rod is "a visible expression of the effect of some suggestion." If he goes in search of any object whatever, the rod will move as soon as the expected impression is made upon him. The rod, in fact, is an indicator of "any sub-conscious suggestion or impression."

The indications of the divining-rod may, therefore, be fallacious; but Professor Barrett believes that with a good "dowser" they are far beyond mere chance. How can this be explained, and also the variety of objects of search to which the rod has been applied? He ventures to suggest the following hypothesis: "That a genuine super-normal perceptive faculty is possessed by some persons more than others; that the faint impressions received by this faculty, though they may be unable to excite consciousness, may be sufficient to create the sub-conscious stimulus which moves the rod or other object held in balanced or unstable equilibrium." A good "dowser" is therefore, in his opinion, "a person who, while possessing the idiosyncrasy of motor automatism, is able to leave his mind so free from the intrusion of reason, conscious volition, or self-suggestion, that his mind is a *tabula rasa*, and the faintest impression made by the object searched for creates an involuntary or automatic motion of the indicator, whatever it may be." This, of course, is a mere hypothesis; but he thinks it is worth further inquiry, in order to ascertain "if certain human beings do possess a super-normal or transcendental faculty, analogous, it may be, to some instincts such as the homing of pigeons." If a peculiar instinct, or super-normal faculty, is the explanation of the success of a good "dowser," then, like the instinct referred to, "it transcends the conscious exercise of reason, and may lie entirely beneath the level of any conscious perception." But it may awake instinctive or automatic action; and this Professor Barrett understands to be the function of the forked twig, which acts as "an index of some emotional or other disturbance occurring within the dowser, which otherwise he could not interpret, and which he cannot explain." After all, he considers that we must go on patiently observing and experimenting, until Science has definitely accepted or rejected the claims of the "dowser;" and a working hypothesis such as he has suggested may, he thinks, stimulate further inquiry. If, as he holds, genuine psychical power is possessed by a good "dowser," we must be prepared for a much more extensive series of tests than those which have already been carried out, and they must take a wider range.

We have now brought to a close our review of this really interesting correspondence. If it has not led to a very definite conclusion as to the exact nature of the water-finder's power, it has probably directed more serious attention than has hitherto been given to a subject which has been regarded by many as belonging rather to the realm of legerdemain than to that of psychology. These persons may possibly still think it unworthy of being raised to a higher plane than that on which they have been pleased to place it. Be it so; but do not let them, to quote Sir Oliver Lodge, "pour scorn upon phenomena merely because they are not yet understood." In the volume of "Conversations of Goethe with Eckermann and Soret," the following passages occur: "If anyone advances anything new . . . people resist it with all their might. They speak of the new view with contempt, as if it were not worth the trouble of even so much as an investigation or a regard; and thus a new truth may wait a long time before it can make its way." These words were selected by Professor Barrett to introduce one of his very able reports to the Society on whose behalf he has been labouring; and with their reproduction we leave the subject to the consideration of our readers.

The London and Southern District Junior Gas Association will meet next Friday at the Regent Street Polytechnic, for the purpose of discussing queries addressed to the members through the medium of the Question Box.

Northern District of Ireland Gas Managers' Association.—We learn from the Secretary and Treasurer (Mr. James Brodie) that a meeting of the Association will be held in Belfast, next Tuesday, when a discussion will take place upon the question of "The Remunerative Disposal of Surplus Tar."

Mr. Mackay's Paper on the "Carbonization of Coal."—We learn that there was an error in our abstract of the paper on the "Carbonization of Coal" which Mr. A. Mackay, of Montrose, read before the last meeting of the Western Branch of the Scottish Junior Gas Association. In the second column on p. 427 it was stated that "the results given were obtained at the expense of from 2 to 2·5 per cent. of fuel;" whereas it should have been "from 70 to 75 per cent. of fuel."

OBITUARY.

Much regret has been caused by the death of Alderman JOHN STONES, J.P., the Chairman of the Smethwick Gas Committee, which occurred on Saturday morning after only two or three days' illness. Deceased held the position of Chairman of the Committee for ten or twelve years, and during this period devoted an enormous amount of time, and gave his personal attention, to everything associated with the Gas Department. The rapid increase in the consumption has demanded considerable extensions of the works, in which Alderman Stones took the greatest interest; always advocating the most up-to-date appliances. He was chief partner in the firm of Messrs. Stones Bros., bolt and nut manufacturers; and his loss will be severely felt at the gas-works, where his genial presence was always appreciated.

PERSONAL.

The vacancies on the Boards of the Harrow and Barnet Gas Companies caused by the death of the Chairman, Mr. Charles Horsley, have been filled by the appointment of Mr. H. J. RYDON in the former, and Mr. J. L. CHAPMAN in the latter case. Mr. A. H. BAYNES succeeds Mr. Horsley as Chairman of the Barnet Company.

The citizens of Manchester, no less than Mr. FRED. J. WEST, are to be congratulated upon the fact that he has been elected a member of the City Council. Twelve months ago, Mr. West failed in his attempt to obtain a seat; but last Tuesday he was successful—an election in the Newton Heath Ward having been necessitated by the elevation of one of the members to the aldermanic bench. On the present occasion there were three candidates, and the result was: Mr. West (Conservative), 1130; Mr. J. J. Rudge (Labour), 902; Mr. F. T. T. Reynolds (Liberal), 570. Mr. West thus had a majority of 228 votes over the candidate who came next. The election was very keenly fought; the proportion of those who voted being considerably higher than usual with municipal elections.

We learn that Mr. W. R. COOPER has resigned the position of Manager and Secretary of the Banbury Gas Company, which he has held for a period of 46 years, and has been nominated for a seat on the Board. Mr. Cooper has worked earnestly and faithfully for the Company; and we are sure the shareholders will be pleased to find that his connection with the undertaking is not to be severed. Mr. Cooper is a member of the Institution of Gas Engineers, having joined the British Association of Gas Managers in 1864. But it is to the members of the Midland Association that he is best known, as he not only attends the meetings regularly, but was President in 1896, and is now Treasurer of the Association—an office to which he was elected on the death of Mr. Peter Simpson, of Rugby, about five years ago. He is an Alderman of Banbury, and has always shown keen interest in the affairs of the borough; having filled the position of Secretary to the Mechanics' Institute. We are sure all his professional friends will unite with us in wishing him many years' enjoyment of the leisure he will now deservedly be able to take.

A Guide to the New Patent Law.—We have received from Mr. John Murray, of Albemarle Street, W., "The Inventors' Guide to Patent Law and the New Practice." It has been written by Mr. J. Roberts, M.A., LL.B., of the Inner Temple, for the use of those who require a simple explanation of the law and rules governing the grant of letters patent in the United Kingdom, and is founded on his larger work on "The Grant and Validity of British Patents for Inventions." The subject is dealt with as fully as space permits. The text is divided into nineteen chapters, and occupies 90 pages. It is followed by the Patents Act, 1902, and the Patents Rules, 1905. There is a good index.

Transactions of the Institution of Gas Engineers.—We have received the volume of proceedings of the Institution of Gas Engineers for the past year. It contains the papers, with the discussions thereon, which came before the members at the annual meeting in London in June, and also the one promised by Mr. W. G. Quicke, of Perth, Western Australia, which could not be completed in time. Reports are also given of the special general meetings called to deal with the question of the affiliation of the District Associations. The gas exhibition held at Earl's Court, under the auspices of the Institution, is only briefly noticed, and a list of the exhibitors given, as a detailed official report of this important event is in preparation, and will be published separately. The technical portion of the contents of the book, which, as usual, is fully illustrated, is supplemented by abstracts of papers, &c., which have appeared in the "JOURNAL" and other publications. The report of the Departmental Committee of the Board of Trade on Gas Testing in the Metropolis is also given. The rest of the matter consists of notices of deceased members, list of those still upon the roll, the office-bearers, the recipients of the Birmingham Medal, the officers and Committee of Management of the Benevolent Fund, and the accounts. The volume is embellished with a portrait of Mr. H. E. Jones, the President for the year; and it has been produced under the editorship of Mr. Walter T. Dunn, the Secretary of the Institution.

THE CAPITAL EMPLOYED IN THE GAS INDUSTRY BY LOCAL AUTHORITIES.

[THIRD ARTICLE.]

By C. E. JONES, Assoc.M.Inst.C.E.

INITIAL AND MAXIMUM PRICES.

IN the earliest efforts made in gaseous statutory codification, a commendable desire to protect the consumer is manifest by enactments fixing maximum prices, limiting shareholders' dividends, and providing magistratic machinery for the enforcement of reductions in price, and maintaining statutory candle power, purity, and pressure. As regards the selling price, these enactments were seldom or hardly ever put in force; and, except where sliding-scales are in operation, by the successful establishment of competitive illuminants, the acquisition of works, and the right to supply coal gas as well as to furnish electric light by local authorities, they are rendered in the majority of cases quite nugatory. Devised as an excellent means of restraining the cupidity of statutory gas companies, their use is now chiefly confined to protecting outlying districts deriving a supply of gas from a borough, gas board, or other elective authority, intent on securing profits to be devoted to purposes within their own area, and from which the outsiders derive no benefit.

However willing a local authority may be to provide themselves with electricity at a loss, it is a notable fact that they decline, notwithstanding the provisions of the Public Health Act, 1875, which advanced the supply of gas to the dignity of a sanitary purpose, to supply gas to outlying or contiguous populous places, except at a profit. Unfortunately, this is not the only instance in which urban democracy evinces a monopolistic trading disposition to oppose and even oppress the rural populations. With the absolute power local authorities possess, in cases of loss, to levy a rate-in-aid, the absurdness of fixing by statute maximum prices for gas sold by municipalities within their own geographic boundaries, is apparent. The fiction is still indulged in; but the following summarized list of maximum rates per 1000 cubic feet for gas shows that local authorities are little, if at all, influenced by such provisions: One rejoices in a maximum price per 1000 cubic feet of 10s., another in a maximum of 8s. 6d., one at 8s. 4d., four at 8s., two at 7s. 6d., two at 6s. 8d., seven at 6s. 6d., one at 6s. 3d., and twenty-six at 6s. Three are fixed at 5s. 10d., twenty-one at 5s. 6d., forty-seven at 5s., three at 4s. 8d., three at 4s. 7d., twenty-nine at 4s. 6d., two at 4s. 4d., three at 4s. 3d., twenty-five at 4s., one at 3s. 9d., one at 3s. 8d., two at 3s. 6d., two at 3s. 3d., one at 3s. 2d., and one at 3s. Fifty-three (about 18 per cent. of the total number of municipalized undertakings) are not limited to price, yet sell equally cheaply as those who are restricted in charges.

Turning to prices actually ruling, it may be observed that some authorities impose graduated charges governed either by the purpose to which the gas is applied (such as cooking or power) or the annual volume agreed on, the greater the quantity the lower the rate per 1000 cubic feet—tempting discounts being offered to large consumers. All make a distinction between the inner and outer limits of supply (the outlying area being that liable to the higher rate); and in the following figures, the highest, not necessarily the mean or the lowest, price charged is the one adopted. The maximum is charged in one or two cases; but usually the selling price is far below the statutory figure allowed. A comparison between the selling price and the maximum fixed by law is not only instructive, but interesting withal. One authority find it necessary to impose a charge per 1000 cubic feet of 7s. 6d., two 6s. 8d., four 6s., one 5s. 10d., two 5s. 6d., two 5s. 5d., nine 5s., one 4s. 10d., ten 4s. 7d., thirteen 4s. 6d., one 4s. 5d., one 4s. 4d., one 4s. 3d., eighteen 4s. 2d., one 4s. 1d., thirteen 4s., one 3s. 11d., two 3s. 10d., twenty-two 3s. 9d., three 3s. 8d., three 3s. 7d., twelve 3s. 6d., one 3s. 5d., twenty-nine 3s. 4d., twelve 3s. 3d., thirteen 3s. 2d., seven 3s. 1d., nineteen 3s., nine 2s. 11d., three 2s. 10d., seven 2s. 9d., five 2s. 8d., two 2s. 7d., six 2s. 6d., one 2s. 4d., and four 2s. 3d. Altogether, 187 charge below the statutory sum—many considerably, a few only a penny or two below it—and two appear to exceed it. Then 130 concerns allow discounts at rates varying from 2½ to 20 per cent.; and the most flourishing undertakings are those selling the lowest-priced gas—such as 2s. 1d. per 1000 cubic feet, 2s., 1s. 9d., 1s. 5d., and 1s. 3d. The latter figure is even subject to discount when used for power purposes. By 83 no charge is made for meters; others make a partial abatement in meter-rent, and supply gas free to public clocks, reading-rooms, and libraries; while in boroughs in England and Wales 28,300 public lamps are supplied with gas free of charge.

This is a record of which it may be said that those responsible for such commercial results have every reason to be proud. The evil is that such low prices or cheap gas are not more general in populous centres, and in the hives of British industry. An obstinate adherence to the principle of high-priced gas leads to curtailing instead of increasing and spreading national industry, aids its depression, prolongs the inactivity of the labour market, and does its level-best to assist the augmentation of the unemployed. The possession of cheap mechanical power is called for, and would enable manufacturers to accomplish much. One resulting effect would be to vivify many minor but languishing trades, rehabilitate decaying and apparently moribund industries, and even

assist in the creation of additional native sources of employment and profitable avenues of commerce. Such a power is cheap coal gas; and it is within the means of municipalities possessing gas-works to provide it. A few of the more enlightened, instructed by the spirit of the times, successfully do so. It is the fervent hope of the writer that the motive force of example will be followed by all the purveyors of an article endowed and enriched by such recognized potentialities.

Earnings per Ton of Coal Carbonized.

Notwithstanding the serious loss under the section of "Unaccounted-for Gas," the earnings per ton of coal carbonized are in the majority of cases remarkably good. It is hardly necessary to observe that obviously the prevention of waste would materially augment the receipts. As in other vocational operations besides those of the destructive distillation of coal, good, indifferent, and poor results are to be met with. It would be surprising, under the circumstances, were it not so. Neither machinery nor men are alike. That the retort-house is the emporium of success, the crucible of prosperity, may be verisimilous, or veritably correct; but something politic is needed in order to really ensure commercial well-being. Complete mastery of the technicalities of carbonization devoid of mercantile knowledge, or practical commercial direction, is incapable of commanding success. The true trading spirit, untiring energy, tactful business acumen, and *savoir-faire*, if not actually bestowed, are difficult of acquirement. It is, however, essential to the successful management of gas undertakings that there exists in no small degree a combination, individually or collectively, of these qualifications. It is a pleasing feature of the gas profession that it affords varied and unbounded scope for the exercise of adaptive talents born of intuitive intellect, and furnishes a broad field for the employment of natural gifts or acquired accomplishments, in so many diversified channels of usefulness.

The following analysis has been arrived at by merely employing three factors—viz., receipts, expenditure, and coal carbonized. Net profit has been disregarded, gross earnings only found, and the division carried to two places of decimals. Weighty material, instructive pabulum, is here offered to gas committees, managers, and others interested; but in digesting the figures advantageously, regard should be paid to the *locale* of the undertaking, special circumstances (if any) connected with each case, quality of coal used, nature of the gaseous and other products, gratuitous services rendered to the public, local markets, and facilities afforded for the sale of residuals. The inequalities are certainly extreme; but the critic should remember that disparity often destroys the value of any comparison. Nevertheless, there is a wide margin for improvement in this branch of our subject. Thus three works give a mean of 1s. 4·66d. per ton of coal carbonized, eight 2s. 5·60d., five 3s. 5·20d., six 4s. 3·33d., twenty-one 5s. 5·57d., sixteen 6s. 4·37d., twenty-five, 7s. 4·32d., twenty-one 8s. 4·05d., twenty-six 9s. 4·84d., sixteen 10s. 4d., eighteen 11s. 5·27d., nineteen 12s. 5·63d., fifteen 13s. 5·53d., nine 14s. 4·88d., six 15s. 4·50d., eight 16s. 6·37d., nine 17s. 2·66d., two 20s. 4·50d., two 21s. 6·50d., one 22s. 4d., one 24s. 2d., and one 25s. 11d. The mean or average earnings per ton of coal may be taken as 8s. 4½d., which is less by about 11 per cent. than gas companies manage to realize.

Earnings per Ton of Coal Territorially.

The soundness and profitable nature of the gas property belonging to local authorities, as also its administrative excellence, is attested by its earnings. After paying all charges, municipalized gas-works in the United Kingdom appropriate for various purposes a mean profit of 3s. per ton of coal carbonized. Ireland heads the list with 4s. 7d.; England and Wales are intermediate with 3s. 3d.; while Scotland is content with only 1s. 2d. Without the latter, the average is 3s. 11d. per ton. It is not suggested that all the works comprised are equally well managed, or that they all make a profit. Such a proposition is not justified, and would be contrary to fact. The non-earning concerns, however, are not numerous; and by a small display of managerial energy, or superior administration, the defaulters could soon be brought into line and made profitable. Some are structurally imperfect, and need thorough overhauling, and many of the administrators would be no worse for a "spring cleaning."

Examination of counties reveals the curious circumstance that agricultural areas yield more gross profit than others more densely populated. Thus Somerset heads the list with a gross profit of 16s. per ton of coal carbonized. Essex figures at 15s. 3d., Norfolk 13s. 8d., Carnarvon 13s. 5d., Lincolnshire 11s. 11d., Leicestershire 11s. 3d., Lancashire 10s. 11d., Cheshire 10s. 7d., Worcester 10s. 7d., Salop 10s. 2d., Derby 10s., Glamorgan 9s. 9½d., Durham 9s. 9¼d., Yorkshire 9s. 5d., Berkshire 9s. 3d., Staffordshire 9s., Cumberland 8s. 7d., Devon 7s. 11d., Nottinghamshire 7s. 9¾d., Warwickshire 7s. 1½d., Kent 6s. 8d. Considered in the light of management, these figures may be taken for what they are worth. They are not advanced in support of any hypothesis, theory, doctrine, claim, or principle, but may be regarded as inquisitional, and the outcome of curiosity. The unexpected often happens in affairs of State, and the gas industry is quite capable of furnishing many surprises.

Receipts and Expenditure.

Receipts per million cubic feet sold may be taken at £171, and expenditure at £129. The mean of joint-stock companies being £187 and £143 respectively, it follows that the latter both expend more and receive more than local authorities; the difference amounting to about £2 per million additional income. This smaller expenditure does not appear in a very advantageous light, since their rivals, by a more liberal outlay, secure an increased proportionate income. Sources and methods of municipal savings may be exemplary or otherwise; but there are scrutineers of public accounts who affirm that low salaries and poor wages constitute a tangible factor in the doubtful economy. Savings on paper, in board rooms or elsewhere, are easily made. Expenditure by local authorities, at all events, is less than that by companies; but they also earn less. While the former apparently save over 8d. per ton of coal carbonized, the latter earn a gross mean of over 6s. per ton. A well-paid board of directors, with no power to levy "rates-in-aid" of losses, and with the prospect of encountering angry shareholders, require to conduct their business profitably, and are stimulated and encouraged to administrative exertion, which inducement is non-existent in elective bodies serving their constituents *con amore*, without fee or reward.

There are many able business men on gas committees who know their work and like it; but it is also true that associated with them are some representatives of stupidity, as well as of the sovereign people. Whether this be so or not, local authorities compared with gas companies effect a saving of revenue expenditure per ton of coal carbonized, amounting in the aggregate to no less than £190,000 per annum. This is a good round sum; and any grounds of complaint as to poorly-paid officials and understaffed establishments seem scarcely justified. A portion even of this amount would enable municipalities not only to be just, but generous, to their officers. It should be recognized that, after an existence of a hundred years, the gas industry has become too important a business to be circumscribed by a bare majority of automaton councillors, who, unfortunately, when such a question as that of voting an increased pittance to some deserving public servant is proposed, exercise an unreasoning, mischievous, and obstructive influence. With men, as with machinery, the cheapest are not always the best. *Experientia docet.* It is well within the cognizance of the author that a directorial body, anxious to economize financially, effected a change in the managership of a gas undertaking. In less than a year of the new *régime*, the leakage account was more than doubled. It is still advancing; and to-day the value of the gas ignorantly and so foolishly wasted five times exceeds the monetary equivalent putatively saved in salary. The lesson taught by the incident would be marred by comment.

Statutory Illuminating Power.

How are the mighty fallen! Truly the descent resembles that of the hawk upon the perky sparrow, or a bolt from the ethereal blue! A few years (or even months) ago, the burning question of illuminating power exercised when opposing Bills in Parliament the watchful faculties of local authorities, troubled the minds of directors, and darkened the brows of many excellent gas managers. It became the iridian question of the day, the text of the photologist. Not to be interested in, or familiar with, its intricacies, was equal to tacit confession of incompetency; not to believe in it, was direct evidence of infidelity and ostracism. Professors of Philosophy and Doctors of Science expounded its mysteries; chemists analyzed its material parts, separating component molecules and elements to the extreme of ultimate analysis; physicists established theorematic propositions; and heaven-descended inventors sought in vain for a standard unit of light without flaw, blemish, or any such thing. Photometry, like astronomy, was destined to become an exact science. Experts figured it out with their customary contradiction. Forensic eloquence of mighty pleaders reverberated through the corridors and committee-rooms of the Houses of Parliament, and peers and commoners alike were duly impressed with its virtues, and urged to bestow upon it a position commensurate with its supreme, momentous, and everlasting importance. To concentrate its divergent rays and focus its intensity, ransacked was the land for men possessed of the highest scientific attainments and mathematical culture.

A triologic, extra-judicial tribunal was created, armed with new and exceptional powers, who were directed to watch over its shortcomings, maintain its quality, and ensure the observance of decorum, if not uniformity, in its hitherto erratic eradiation. Stringent provisions were enacted, and rules laid down, for the regulation of its conduct; and soon the Statute-Book bristled with penalties for any proved default or deficiency of emissive luminosity. The infant prodigy was tenderly nursed and amylic, benzolic, butilic, etheric, methilic, naphthalic, and other carbonic pabulum was carefully administered, homœopathically; and the child grew from 10 to 25 candles and upwards. Waxing fat, it followed the example of a certain Hebrew king and people, and kicked. In the Metropolis and elsewhere, testing-places—substantial buildings, or fairy edifices, enclosing most delicate and costly apparatus for ascertaining the state of its health, and diagnozing its complaint—arose as if by magic; and examiners strained their devoted optics in order to discover and record its value in standard candles to the hundredth part of a grain of sperm. Gas engineers went abroad by day with damoclean insecurity, and sable night found them haunted by the gaunt spectre of Illuminating Power. Now all is changed! Its "power" is bunsenized and mantlized out of recognizable existence; and, like the late lamented Cæsar of nasal prominence, who but

"yesterday stood against the world, now lies there, and none so poor to do him reverence." Its departure from the scene of its former glories is ordered, and its obsequies are in preparation. Its descent, like Lucifer's, has been sudden, but more pathetic, and constitutes the most remarkable episode in the history of gas lighting.

"It is written on the skies
Of the soft blue summer day;
It is traced on sunset's dyes—
'Passing away.'"

Poor departed friend, how we shall miss thee! "A few more years shall roll," and we shall know thee not! Thy passing bell is sounding even now! For over half-a-century, thou hast been a bone of parliamentary contention. A theme for evidence, and a source of profit to many. Legal luminaries have drawn inspiration and glistening "refreshers" from thy effulgence, and eminent experts have reaped a golden harvest from thy luminous beams. Photometers will lose their legal terrors, while "calories" supplant luminosity, and British Thermal Units usurp the long arbitrary reign of poor deposed Illuminating Power. Thus "the whirligig of time brings in his revenges." Losing so much of its significance and technical interest, some mourners may wish its passing to be solemnly silent, and the requiem soft and low.

Before, however, inscribing *Requiescat in Pace* over its remains, and sealing the sepulchre, it may be well to place on record, for the instruction or amusement of the coming New Zealander or student in gaseous history, a few facts in connection with what is now admittedly a greatly over-rated idea. Coupled with its twin sister Purity, it has been responsible for much capital expenditure, which will now be obsolete. Although the total abolition of statutory obligations in respect of illuminating power is imminent, there will always remain an intimate relationship, not easily dissociated, between the B.T.U. and candle power of coal gas. Hydrogen, marsh gas, and carbonic oxide gas are closely allied to calorific value. Presumably, then, the photometer will be useful in the new tests, though a low candle power may no longer entail compulsory attendance in a Criminal Court. The candle power prescribed for local authorities, which they have mostly inherited from their predecessors in ownership, may be summarized as follows: Five undertakings are obliged to supply gas of 12 candles, 106 of 14 candles, 81 of 15 candles, 33 of 16 candles, 1 of 17 candles, 8 of 18 candles, 7 of 20 candles, 1 of 21 candles, and 1 of 25 candles. There are sixteen works where illuminating power is not prescribed, and four frankly confess that no tests are made. Generally, no independent authority exists for testing municipalized gas. The whole thing is a dead-letter, and its retention in Acts of Parliament a farce.

(To be continued.)

CALCULATORS FOR THE VELOCITY OF DISCHARGE OF FLUIDS FROM PIPES.

We have received from Mr. E. Hertzsprung, of Copenhagen, specimens of the calculators made by him for the rapid computation of the velocity of discharge of fluids from pipes. They are of two kinds—the first being for water, and the second for coal gas. For some time, these instruments have been made with graduations suitable to the metric system; but those now to be described are much more convenient to engineers of the English speaking world, as they are expressed in Imperial units. The calculator for water supply is based upon the following equation:

(1) $Q^2 l = 273\, h d^5$ (or more precisely $Q^2 (l + d)$ in lieu of $Q^2 l$)

where h is the fall of pressure in feet of water,
" d " " diameter of the pipe in inches,
" l " " length " " " " yards,
and where Q represents the quantity of water flowing per minute in gallons.

The diagram (fig. 1) shows how the graduations are arranged on the upper and lower fixed scales for diameter of pipe and volume of water respectively, and also those on the slider, for the fall of pressure in feet and for the length of main in yards, upper and lower respectively.

The above basis of calculation agrees with the usual rule adopted in this country, where, however, it is expressed in an equation in which all the dimensions are in feet, the volume in cubic feet, and the time one minute.

(2) $Q = 2356 \sqrt{\frac{h}{l} \times d^5}$.

This mode of grouping the factors, shows that the two represented by the slider move according to the square root of the dimension, the head (h) directly and the length (l) inversely; while those represented by the fixed scales move according to the square root of the fifth power of d (the diameter) for the upper, and according to the group $\sqrt{\frac{h}{l} \times d^5}$ for the quantity delivered for the lower one. Equation (2) represents the basis of Dr. Pole's familiar equation for gas passing through pipes, which incorporating results of tests on the friction of gases against the walls of pipes and based on other units became

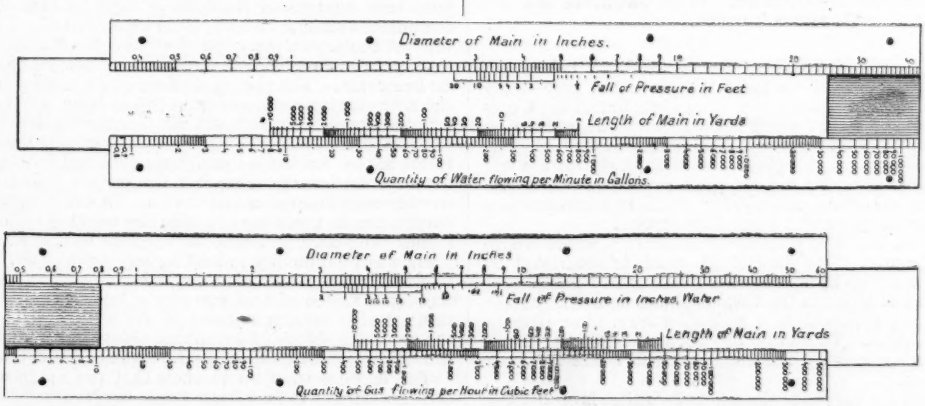
(3) $Q = 1350 \sqrt{\frac{h d^5}{sl}}$ or (4) $h = \frac{Q^2\, sl}{1350^2 \times d^5} = \frac{Q^2\, sl}{1822500 \times d^5}$.

Equation (4) has been adopted by Mr. Hertzsprung in the graduation of his gas-supply calculator, which for a specific gravity $s = 0{\cdot}425$ becomes

(5) h = the effective head or pressure in inches of water = $\frac{0{\cdot}00000023\, l\, Q^2}{d^5}$ where Q = cubic feet of gas delivered per hour, l = length of pipe in yards, d = diameter of pipe in inches. The results obtained by using the calculator have been checked by direct computation from Equation (3) and found to agree.

The range of usefulness of the instrument is limited by its applicability to one specific gravity of gas, and by 2 inches of water being the maximum head allowed for gas, and 20 feet for water. Upon this latter point, Mr. Hertzsprung however states that, since the fall of pressure is proportional to the length of main, it would suffice for gas where higher pressures are concerned to proceed as follows: For a length of main of 5000 yards, with a fall of pressure permissible of 20 inches of water, take the readings for a length of 50 yards and a fall of pressure of 0·2 inch or water. For gases of a specific gravity other than ·425, a correction may be applied by multiplying the figure obtained from the calculator for Q by $\sqrt{{\cdot}425} = {\cdot}65$ and dividing by the square root of the specific gravity of the gas to be delivered.

Fig. 2 shows the gas-supply calculator, upon the reverse side of which there is given a description and the following example (which we have reproduced in somewhat abbreviated form) as to how it may be used: Suppose we want to pass 1000 cubic feet per hour through a pipe 40 yards long, then $Q = 1000$, and $l = 40$.


Diameter of Main in Inches.
Fall of Pressure in Feet
Length of Main in Yards
Quantity of Water flowing per Minute in Gallons.
Diameter of Main in Inches
Fall of Pressure in Inches Water
Length of Main in Yards
Quantity of Gas flowing per Hour in Cubic Feet

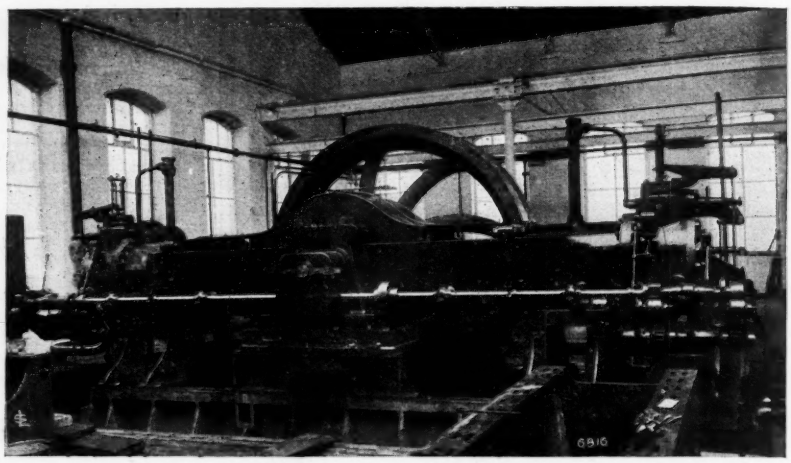
By shifting the slider set $l = 40$ to $Q = 1000$. Then consider what fall of pressure might be allowed. Say this is 0·2 inch. Read off the value of d corresponding to $h = 0{\cdot}2$. This is seen to be between 2 and 2½ inches. In considering what amount of fall of pressure may be allowed, it is necessary to add the difference of atmospheric pressure between the inlet and the outlet of the pipe, if the outlet end be higher than the inlet, and deduct it if it be lower. Again, to find how much gas will go through 40 yards of 2½-inch pipe with a loss of pressure of 0·2 inch, shift the slider so as to set $h = 0{\cdot}2$ to $d = 2{\cdot}5$; and at the other edge of the slider read off the value of Q corresponding to $l = 40$. This value of Q will be about 1400 cubic feet per hour.

It will have been made clear from the foregoing description that the gas-supply calculator is not applicable where pressure is applied sufficient to cause compression of the gas at the inlet. Under these circumstances, the equations brought to the notice of the Institution of Gas Engineers by Professor W. C. Unwin at the last meeting are those to be employed.

A TWO-HUNDRED-AND-FIFTY HORSE POWER GAS-ENGINE.

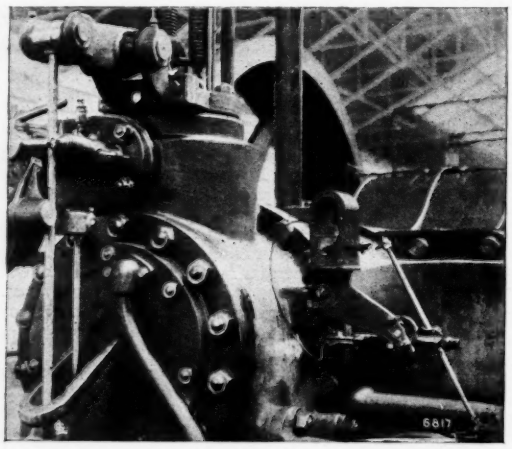
[Reprinted, with the Illustrations, from the "Engineering Review," by Permission of the Editor.]

The gas-engine illustrated in the accompanying half-tone is one recently completed by Messrs. J. E. H. Andrew and Co., Limited, of Redditch, and embodies several interesting features. It will be seen that the engine is of the type in which the cylinders are placed facing each other at opposite ends of the bed-plate, and drive on to a crank shaft placed in the centre. The design of the cylinders permits of their being bored throughout at one setting, and the combustion chamber, being machined, is readily and effectually cleaned. The inlet valve is situated at the top of the cylinder, and the exhaust at the bottom opposite each other, both having ample area. By this arrangement the makers state that a direct flush is obtained, with the corresponding advantage of a better clearance of the cylinder. The air-valve and the magneto-ignition plug are fixed opposite each other on the cylinder in a lateral direction; the whole arrangement facilitating the removal of the cylinder covers and giving direct access to the various parts for cleaning.



250-Horse Power Gas-Engine.

A strong frame built of steel boiler plates forms the rocking lever for actuating the valves; motion being given to each lever by two cams acting upon steel rollers supported between the arms. The action of the valves is aided by springs, which are placed in full sight, and are easily accessible. Two springs, equidistant from the valve spindle, are used; being coupled to a cross-head fastened on the spindle—thus giving a straight and even pull.



250-Horse Power Gas-Engine. View Showing the Magneto-Igniter.

All this mechanism is in full sight. The air and gas valves are separately controlled. The whole of the parts run very easily during working. The exhaust valve works in a barrel kept cool by a constant flow of water, which subsequently passes through the cylinder cover jacket. The cylinder is also water jacketed; outlets being provided at the highest points to drain off the hot water. Six gallons of water are required per horse power per hour to effect the necessary cooling, for which two services are required—a main service and a secondary service.

Special attention has been paid to the lubrication, which is both ample and continuous. The flow of oil, which is controlled by regulating taps, is set up by means of a small rotary pump connected by a series of pipes to the various points of delivery; the excess of oil being returned to a collecting tray, after passing through a gauge sieve. To enable the engineman to fill up the lubricating pipes on starting the engine, a free wheel has been fitted to the pump.

The mechanism for operating the magneto-igniter is of interest, and may be discerned in both illustrations, more particularly in that showing the end view of the cylinder. The function of the mechanism is to accurately regulate the moment of ignition; this being effected by a vibrating rod carried by two stout arms. The upper end of the rod, in vibrating, makes contact with a trigger, through which the armature is caused to rotate, thus producing a spark. The release of the trigger breaks the circuit. The fulcrum of the rod is determined by a small eccentric mounted in, and carried by, the bracket, which also carries the pivot of the two short arms. The eccentric can be adjusted by a toothed quadrant, so that the position of the fulcrum of the rod is varied at will. This action is almost simultaneous, and can be very exactly regulated as to its period.

An independent supply of air, furnished by a compressor driven by a small engine, is used for starting the engine; the air thus used serving also to flush out the cylinder. A special valve regulates the supply of air, the former remaining open while the engine runs slowly, but closing automatically on the engine reaching normal speed. The aim of the makers in turning out an engine of excellent design with ready accessibility of all working parts has been ably achieved.

INTERNAL COMBUSTION ENGINES.

At the Society of Arts, on Monday last week, Mr. Dugald Clerk delivered the first of a course of Cantor Lectures on the above-named subject. It was devoted almost entirely to a consideration of the simplest conditions under which these engines could work. The following are the points of most interest to our readers.

Mr. Clerk began by pointing out that an internal combustion engine is a heat engine in which the working fluid is mainly atmospheric air, and the fuel an inflammable gas or vapour. It differs from a hot-air or steam engine in one important point—viz., that the heat to supply the motive power is given directly to the working fluid by combustion within the motor cylinder. Having reviewed the work of various investigators into this subject, from the time of Rankine, in 1854, he said that, in spite of the amount of time and attention expended about the middle of the last century in the hope of making the hot-air engine a practical success, the difficulties of the task proved too formidable to be overcome. The principal cause of failure lay in the fact that the rate of transmission of heat to air from any external source was too slow. Ericsson and Sir George Cayley tried to utilize the principle of internal combustion to impart the necessary heat to the air by forcing it through an enclosed furnace, and passing it to the engine cylinder; but the project failed on account of trouble with the piston and valves. In every successful modern engine, the fuel was burnt inside the working cylinder. A much higher temperature might be used in this class of engine, and there was no difficulty in heating any mass of air, however great, in a fraction of a second. The conductivity of air was very slight, and the diffusion of heat was almost entirely effected by convection; the low conductivity of air for heat, which was previously the stumbling-block of inventors, being now a distinct advantage in minimizing losses through the walls of the cylinder.

The lecturer went on to show that the modern internal combustion engine differs from these crude attempts in invariably conducting the combustion within the cylinder, and burning only vapour or gaseous fuel. He said the method of heating by combustion or explosion at once disposed of all the troubles referred to. It not only widened, almost indefinitely, the limits of the temperatures at command, but the causes of failure with the old air-heating methods became the cause of success with the new. The difficulty of heating even the greatest masses of air was quite abolished. The conductivity of air for heat was but slight, and both losing and receiving heat from enclosing walls were carried

on by a process of convection, so that the larger the mass of air used the smaller was the relative cooling surface. From this it followed that the greater the volumes of air used the more economical was the new method and the more difficult the old one. The low conductivity for heat which was the cause of so much trouble in hot-air engines became the unexpected cause of economy in the modern motors. So long as one kept in mind the fact that corrections have to be made in applying the ideas gained from air-engine reasoning to practice, Mr. Clerk said it was better to first treat the subject as if air only was being dealt with as the working fluid, and the air was considered as heated by combustion without changing its chemical or physical properties. He would therefore deal first with the thermo-dynamics of the internal combustion motor considered as an air-engine pure and simple. In all modern motors of this type, whether operated by coal gas, petrol, alcohol, or producer gas, one feature was invariably found —viz., the compression of the working fluid before combustion. Compression was advantageous, not only because it allowed of higher operative pressures for given temperatures and higher expansions, but also because it formed an essential part of the operation of an ideally perfect heat engine.

Mr. Clerk then proceeded to deal in some detail with the thermo-dynamics of his subject by means of diagrams; illustrating his remarks by a description of the Carnot cycle, and stating that, as worked out by Rankine and Thomson, it was the foundation of modern thermo-dynamics. Only quite recently, however, Professors Callendar and Unwin had shown that even in this cycle the efficiency is determined by the adiabatic compression line, and that it also has the same value for a given compression as is found for either constant volume or constant pressure cycles. He directed attention to a combined diagram in which these cycles and the Carnot cycle were shown—the feature in common with the three, however, being that the maximum pressure was the same. He said these diagrams, with the details accompanying them, would prove useful to engineers designing gas-engines, as showing the pressures which would be given by ideal air-engines corresponding closely to the different types. But the most interesting and important, from the manufacturing engineers' point of view, was, of course, that dealing with the efficiency of the constant volume cycle. This was the cycle now followed in the great majority of cases. Only one constant-pressure engine appeared to be upon the market at present, and that was the Diesel oil-engine. The lecturer showed a table of hypothetical efficiencies on the air-engine standard corresponding to various degrees of compression. They ranged from compression space equal to 0·5, giving an efficiency of 0·246, up to compression space equal to 100, giving an efficiency of 0·85. He remarked that these efficiencies could, of course, only be obtained in an ideal engine, assumed to exist without heat losses of any kind, working with air having a constant specific heat, and so operated that no value or throttle losses were incurred. He reminded the audience, however, that no actual engines show efficiencies so high as these for any given compressions.

Before considering the question of actual efficiencies in engines, it is desirable to understand, to some extent, what goes on in a gaseous explosion; and this was the next matter dealt with by Mr. Clerk. He pointed out that if air at a temperature of 0°C. and at atmospheric pressure is confined within a closed space—say, a closed vessel—and is then heated, for every rise in temperature of 1°C. the pressure will increase by 1-273rd. That is to say, when the temperature is raised to 273°C., the pressure within the vessel will have increased to two atmospheres; and when raised to 546°C., the pressure will be three atmospheres. The pressure will continue rising with the temperature; so that at 2184°C. the pressure of the confined air will have risen to eight atmospheres. This increase of pressure will occur in whatever way the air may be heated—whether by heating the enclosing vessel, by means of electric currents passing through platinum wires, or by internal combustion. This is practically what happens when gas is mixed with air, and the mixture then ignited within a closed vessel. Professor Bunsen in 1866 proposed this method of determining the temperature produced by gaseous explosions; and twenty years later Mr. Clerk made similar experiments to those carried out by the great German chemist. They clearly proved that a gaseous explosion produces a maximum temperature of nearly 2000° C., and that it is caused by a pressure of slightly more than 100 lbs. per square inch above that of the atmosphere. The lecturer pointed out, however, that, to get quite accurate explosions, allowance must be made for chemical expansion or contraction; this being the principal factor, apart from heat value, which determines the difference in behaviour of various gaseous explosions.

In discussing the application of the theory of compression to the actual efficiencies of internal combustion motors, Mr. Clerk emphasized the desirability of so arranging matters as to avoid the necessity for accepting any particular theory; and he said it was his intention to do this in his lectures. It was desirable, however, always to bear in mind that although for the sake of simplicity he should discuss internal combustion engine problems as if he and his hearers had to do with an air-engine pure and simple, yet in considering the actual conditions of practically operating engines, the problem was very much more complex. He pointed out that the amount of heat not accounted for by the rise of temperature in gaseous explosions, assuming constant specific heat, varies from 30 to about 50 per cent., depending upon the strength of the explosive mixture. If the mixture approaches the maximum flame temperature, considerable heat suppression is found. If, on the other hand, it is near the point of mission firing by over-dilution, heat suppression is equally great. The greatest heat evolution is found with intermediate mixtures, such as those of coal gas and air ranging from 1 in 10 to 1 in 12. These are the mixtures most economically used in coal-gas engines.

Mr. Clerk concluded by saying that much has yet to be done before all the actions going on in the cylinder of an internal combustion engine can be fully understood; but he thinks that if we keep clearly in our minds the efficiencies possible with engines which do not suffer any heat losses, and are not subject to any complications as to chemical action or change of specific heat, we shall hold a key which will help us to find our way through many complexities, and obtain clear indications of the line of progress. In order to advance quickly, he remarked that it is necessary to understand fully; and many experiments yet remain to be carried out to enable us to understand the peculiarities of the different gaseous and vapour explosions now utilized in these engines. Experiments have still to be made upon the specific heat of the products of combustion at high temperatures, upon the laws of cooling of the flames within the cylinders, as well as upon the laws of combustion, proceeding at the enormous rates experienced in these engines. Especially urgent is the requirement for explosion and cooling curves for coal gas, petrol, alcohol, producer gas, and blast-furnace gas explosions. Some of these matters, however, he proposed to deal with when considering the indicator diagram in his second lecture, which was delivered last night.

MANCHESTER JUNIOR GAS ASSOCIATION.

Steel Tubes as a Substitute for Cast-Iron Mains.

At a Meeting of the Manchester District Junior Gas Association held on Saturday, Mr. JOE ALSOP read a paper in which he described a high-pressure auxiliary supply gas-main which has recently been completed at Stockport to overcome deficient pressure in one of the outlying districts.

The PRESIDENT (Mr. Harold Smith, of Bury) said the Council had not been able to arrange a date for the discussion of Mr. Teasdale's paper on "Roofs" (*ante*. p. 228); but this would be done as soon as possible.

Mr. ALSOP then read his paper, of which the following is an abstract:—

The main in question is composed of 4-inch and 3-inch Mannesmann weldless steel spigot and faucet tubes, in varying lengths up to 35 feet over all. The pipes are about $\frac{3}{16}$ inch thick, and are coated and covered with jute cloth to prevent corrosion. Being a non-conductor, damage by electrolysis is obviated. The total length of the main is about $4\frac{3}{4}$ miles. It is taken direct from the works, and connected with the existing low-pressure main at the other end. It has valves, syphons, and pressure cocks along the route; but no services have been taken off it as yet.

The jointing was done in much the same way as with cast-iron mains; but, in place of the usual spun yarn, a cold lead ring was employed. In the present case, however, it was found that $\frac{3}{8}$ inch lead piping cut into suitable lengths and then flattened, and having a slight taper on one edge, answered equally as well; the thin edge being inserted first, and the joint then run with hot lead as usual. It was advisable to have a man stationed at the other end with a bar embedded in the bottom of the trench, with which to press against the end of the tube until the operation of caulking and running was completed, as the tubes, being so much lighter than cast-iron pipes, are apt to slip a little away from the caulking-hammer and tools. In seven places along the route, the trench was on the curve of such large radius that bends would have been useless unless made specially. It was, however, possible, by means of a jack and crow, to bend the tubes so as to get a neat and regular curve. The bending was done immediately over the trench, so that on the completion of the operation the tube was ready for lowering.

Mr. Alsop said that in crossing over bridges or places where not much covering is obtainable, these tubes have an enormous advantage over cast-iron mains, as they possess absolute immunity from breakage by heavy vehicular traffic. Then, again, if it was necessary to cross alongside a bridge of 60 feet span, this could be done by using two tubes, which would only mean one joint, and one or two very light brackets; whereas if cast-iron pipes were substituted, the supports would have to be very much stronger and placed at a less distance apart, besides some six joints being required. Another advantage of the tubes is that their flexibility and elasticity enables them to "give" without fracture; and in passing over coal cellars, between existing mains, under tramways, &c., their length enables excavation to be reduced to a minimum. The long lengths are also economical, as requiring the use of fewer joints; there being a saving of about 238 joints in 1000 yards, as compared with 4-inch cast-iron mains. In this connection there is not only the smaller cost of labour, &c., to be taken into consideration, but the reduction of possible sources of leakage.

Connections for services, remarked the author, may be made as follows: First remove the jute cloth covering from the tube where the connection is to be made, drill a hole of the size required, and bolt on a clip—first putting in a small sheet of

lead, or, in the case of figs. 1 and 2, a small lead washer. The clip then only requires to be firmly bolted on, and the services are screwed into the brass radiused casting. Another form of clip is shown in fig. 3, and is made 2½ inches wide. In this case, the service-pipe is screwed direct into the clip itself. If, however, a larger service is required, then a clip having a cast-iron branch clamped on, as fig. 4, would answer the purpose very well. There is yet another way (and a simple one)—namely, slide along the tube an ordinary thimble, and when in position run it solid

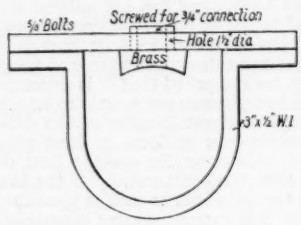


FIG. 1.

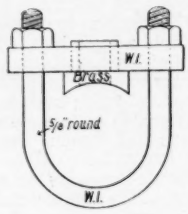


FIG. 2.

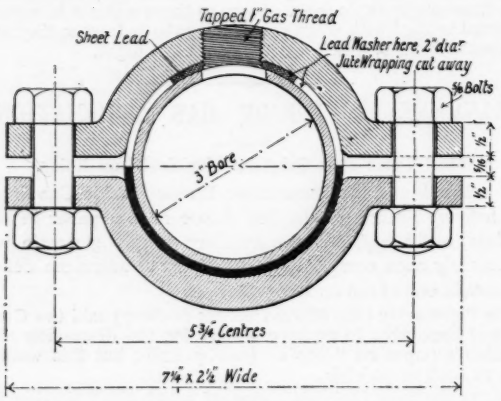
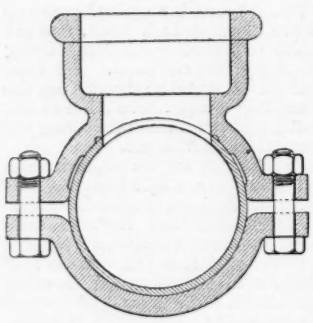


FIG. 3.



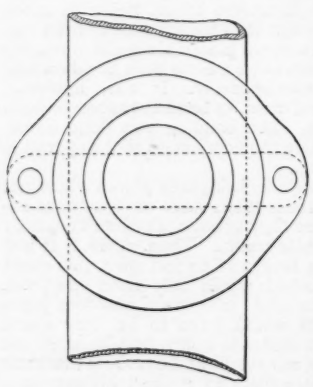


FIG. 4.

with lead both ends at once. Then drill and tap the hole through the thimble, lead, and tube, and put in (say) the syphon connection. The latter method is, of course, not economical for every service; but it is handy when short of a clip. These are only some of the many ways that might be adopted.

The clips shown in figs. 1 and 2 were designed by Mr. George Helps, of Nuneaton, and are provisionally patented. Illustrations of other clips designed by Mr. Helps were also exhibited at the meeting, as well as a service-joint made in the manner explained by the author.

In view of the fact that the main in question is ultimately to be used as a high-pressure one, it was considered necessary during the laying to have each day's work tested before the tubes were finally buried; and the wisdom of this course was abundantly proved on many occasions. For the purpose of the test, clips were put on each end of the main, and water pressure applied—the pressure obtained at the end farthest from the works, of course, varying according to the altitude. All joints and tubes were examined while under pressure; and often it was necessary to slightly tap the joints with the caulking tools, for even the slightest bubble of water appearing upon the surface of the joint was regarded as unsatisfactory. After the test, the joints were wrapped with jute cloth, covered with solution, and the filling-in of the trench was proceeded with. The record day's work in laying was 387 lineal yards; and had the weather and daylight not been unfavourable, several more could have been put down. When the main was laid, the men had to start work in the dark, and they finished in the dark. Every joint in the tube was measured, and will be ultimately plotted upon the borough survey, thus enabling them to be got at with certainty.

Mr. Alsop remarked that many engineers were opposed to the use of steel, under the mistaken assumption that it corroded quickly; but he pointed out that steel ships lasted a very long time, and steel rails in abandoned collieries were often unearthed and found perfectly serviceable after having been buried for a number of years. Steel boilers, too, after having done long duty as steam generators, were frequently found in use as water-tanks, &c. Again, the fact was often overlooked that to cause corrosion it is not sufficient that the atmosphere surrounding the object should be damp—there must also be a free circulation of air. Therefore he thought that neither the damp of the ground these tubes (protected as they are) might be laid in nor the moisture of the atmosphere would attack their surface; and they should be quite as serviceable as, if not more so than, cast-iron pipes.

The Borough Engineer of Swansea, he understood, had had great trouble with cast-iron water-pipes on account of the roads there being made principally of ashes from tin-plate works, and over which it was the custom for spent pickle (used in tin-plate manufacture) to be emptied. In some cases, cast-iron pipes were corroded away in less than six months; and so he tried an experiment of using a steel tube and placing same alongside the cast-iron main. After eighteen months in the ground, the cast-iron pipe was found to be corroded practically through over the whole of its surface; while the steel tube was found to be intact, the coating solution on the outside surface being as good as when it was originally put on. The Cardiff Water Engineer inserted between two lengths of cast iron a length of Mannesmann steel tube. The water in Cardiff was of a somewhat acid nature, being moorland water. The pipes were examined after fifteen months' service; and the cast-iron pipe on the ingoing side was corroded up to the extent of ⅛ inch reduction in the bore. The steel pipe was practically untouched; and the outgoing cast-iron pipe, being of a harder nature than the ingoing, was only corroded up in patches, but still very much more so than was the case with the steel. At Brux, some of these same tubes had been laid for thirteen months along the bottom of a town sewer; and yet they showed no signs whatever of rusting—the colour of the tubes having remained a glossy black. The section of steel was very much more homogeneous than cast iron; and this fact alone must help to convince one that they were not more subject to corrosion.

In conclusion, the author acknowledged the kindness of Mr. S. Meunier in allowing him to give the members the particulars contained in the paper.

Discussion.

Mr. Teasdale said he had noted one or two points during the reading of the paper. The first was the idea of bending the tubes, which he considered to be a very good one. The services shown in the drawings seemed to be rather costly; and it was a pity the prices had not been given. The cost should go a long way towards determining whether a steel or a cast-iron main should be laid.

Mr. Alsop said he could assure the members that the prices were not high; but this was as far as he could go.

Mr. Teasdale went on to say that in the case of the steel main, by adopting longer lengths they had fewer joints. This applied also to cast-iron mains. The tendency now was to get greater lengths of these mains. With regard to strengths, it was known that steel in a main had about three times the strength of cast iron; but, on working the matter out, he personally found, on referring to the various lists issued by the steel tube manufacturers, that cast-iron mains were the cheaper by something like four times. He had put in a 36-inch steel welded main, the flanges of which were faced and grooved, and it worked out to about 28s. 4d. per foot. He had also put in some 36-inch cast-iron pipes, with open sockets, and these worked out to 17s. per foot; showing a gain of 11s. 4d. per foot. It had been proved that cast-iron mains were very durable; and engineers put their average life at 50 years. He should like to have a record as to the life of a steel main. With regard to the service put into a main of the latter kind, he thought they never knew the distance they had gone through the metal, and consequently there was very often left inside a projection which caused deposit. If there was any naphthalene in the gas, would this not collect round that point, and obstruct the service? The clip on the main seemed to be the best way of avoiding such a block.

Mr. Garlick expressed the opinion that in the longer lengths of pipe there would be a certain amount of leverage that would tend to draw out the lead. With regard to service-pipes, he thought the piece of pipe shown would be rather weak. A back nut would only to a certain extent bind portions. In some of the sketches, there were clips which seemed to be expensive. They were not made without expense; and he should like to hear Mr. Alsop's opinion on this matter.

Mr. Ginman thought it would be quite worth while to consider the question of cast-iron tubes with jute cloth, and then, with a solution. At Wigan, they took the trouble to put a trough round the service-pipes, and cover it with pitch.

Mr. Hill said he had an idea of putting down, at the first opportunity, a few hundred yards of steel tubing, to give it a trial. He must concur with Mr. Alsop that in such cases as crossing a bridge steel tubing was the thing to use. With regard to rusting, his experience with steel tubing was that paints and most things put on did not adhere as they did to cast-iron pipes.

Mr. TEASDALE said he understood Mr. Alsop to say that if there were subsidences in a steel main, it would simply bend, owing to elasticity, whereas in a cast-iron main, it would break. Was it not as broad as it was long? If a steel main bent, there was always a deposit from the gas which must settle in the lowest part of the main; and in proportion to the extent of the bend, it would close the main. Therefore if it bent enough, and the deposit was sufficient to close the area, he should say the argument applied to both.

Mr. DUDLEY asked whether the pressure through the steel pipe was greater than that for cast iron. He thought it would be rather out of place to introduce a new style of pipe and still retain the old-fashioned joint.

Mr. STODDARD said he should imagine that wrought-iron pipes, and also steel pipes, would corrode very readily. He thought if these 3-inch pipes were laid in rough ground they would have to be replaced before many years had passed. He agreed with other speakers that before discussing the subject of the paper they ought to have the comparative cost.

Mr. CRITCHLEY remarked, with respect to the covering for pipes, that he once saw a steel main that had been covered with pitch, but the cast-iron main which was connected up to it was not covered at all. He considered that some coverings were wanted for mains and services.

Mr. J. TAYLOR said he knew cases where cast-iron gas-mains had been in use for 40 years; and a water-main in Wigan had been down nearly 70 years.

Mr. ALSOP, in replying upon the discussion, said the life of the tube was, of course, a point which they had, as it were, to try. English engineers had not yet taken up this matter so fully as those on the Continent; and the experience seemed to be all abroad. It was generally the case, if anything new came forward, everyone was against it. He, however, did not like to keep to old ideas if there was anything better. If they were going to advance, let them advance at once. With regard to the cost, he did not think that, in the size of tube he had dealt with, it would come out any higher than that of cast iron. In the case of high-pressure gas, there would certainly not be anything else adopted but steel. One speaker had referred to pressure. Of course, they had not got it working as a high-pressure main yet, but only very slack. He supposed, however, they would later work to about 25 lbs. per square inch. It was an independent main, and there were no branches; but it was quite a simple matter to take off a branch if required. In their ordinary services, they used troughing and and cement composition.

The PRESIDENT, in proposing a vote of thanks to Mr. Alsop for his paper, said they had had very little experience with steel mains, and he thought great credit was due to engineers who would risk the expense and trouble of trying these new developments. The members, however, gained their experience, even if they did not go to the expense of trying the thing themselves.

The vote of thanks was unanimously accorded.

SWISS TESTS OF GAS COALS.

The Swiss Association of Gas and Water Engineers have under their control a coal-testing station, which is found very serviceable by the members; and at the annual meeting of the Society held at Lausanne last September, Herr Weiss, the Gas Engineer to the Municipality of Zurich, gave an account of the work done during the preceding twelve months. In that period the station was utilized principally for the gas-works at Bâle, Berne, Geneva, and Lausanne; but some foreign colliery-owners availed themselves of it. The tests were carried out by Dr. Otto, the Chemist to the Gas Department at Zurich. Before submitting his particulars to his colleagues, Herr Weiss made a few general observations on the conditions under which gas making is conducted in Switzerland. There the gas manager has to depend entirely upon outside sources for his supply of raw material, and consequently to pay dearly for it, owing to the cost of carriage. As this is the same whatever may be the quality of the coal, it is of the highest importance that he should select that which will be the most serviceable to him. This, however, he is not always able to do, owing to its scarcity in the market. The geographical situation of Swiss towns in relation to the coalfields causes French and German coals to preponderate. Sometimes, however, Belgian coals are utilized; but of late years it has been almost exclusively English coals which have competed with any degree of success with those coming from the immediately adjacent countries. It is shown by statistics that in the centre and north-east of Switzerland the only German coal used is that coming from the Ruhr and the Saar; whereas in the west it is chiefly French, from the Pas de Calais, Loire, and Courrière basins, together with a little German. In the period dealt with by Herr Weiss, the quantity of coal carbonized was 262,714 metric tons, valued at 8,734,751 frs. (£349,390). Of the total, 202,294 tons were German (about 160,000 tons from the Saar and 42,000 tons from the Ruhr), 57,912 tons French, and 2508 tons English. In addition, 3227 tons of mixed coal were utilized. Of the total quantity of imported coal, 77 per cent. was German, 22 per cent. French, and 1 per cent. English.

The tests were not made with a view to determine the real value of the various coals sold in the Swiss market, but to fix their relative commercial values. It was sufficient, therefore, to ascertain the gas production per kilogramme of coal, its illuminating and calorific power, and the quantity and quality of the principal residual product—coke. In the case of works of large and average dimensions, the other products, such as tar, sulphate of ammonia, cyanides, &c., were, of course, also important. It is hoped that in the course of the next two years the Association will be in possession of plant by which it will be possible to test, both quantitatively and qualitatively, not only the principal products of the distillation of coal, but also the secondary products. For their present purposes, however, 5 kilos. (11 lbs.) as a minimum are required in order to obtain a good average sample with which to make two tests in the event of one giving an unsatisfactory result. In the existing apparatus, the coal is carbonized in a cast-iron retort having a capacity of 2·2 lbs. It is heated by gas up to 700° C. or 800° C. (about 1300° or 1400° Fahr.), which is a rather lower temperature than that of an ordinary retort; so that the process of experimental distillation does not conform precisely to that of every-day working. However, it is sufficiently near to allow of comparable results being obtained.

In the tests made in the period from Dec. 1, 1903, to September, 1904, the following points were taken into account: The source of the coal, the quantity of gas produced per kilogramme (the gas being measured dry at 60° Fahr. and at a barometrical pressure of 30 inches), its light-giving and calorific power, the yield and appearance of the coke, and the character of the ash. These particulars having been obtained, the commercial value of the sample as a producer of light and heat was deduced therefrom. In some cases the quality of the gas was ascertained by analysis. It was recognized, however, that since the introduction of the Welsbach burner and the largely extended use of gas for culinary purposes, illuminating power is not the main consideration of the gas maker; while the quality of the coke has become of more importance. But in presenting to the members the results of the tests, the author began by examining coal from the point of view of its gas-producing capacity. It was found that French coal yields as much as German; English coal usually a little less. There is great variation in coal coming from the same pit, as shown by the following figures:—

Kind of Coal.	Yield of Gas per Kilogramme. Litres.*	Difference. Litres.*	Variation. Per Cent.
French (Montrambert)	278—319	41	15·0
German (Heinitz)	294—329	35	12·0
,, (Nordfeld)	285—323	38	13·0
English	309—335	26	8·4

*100 litres = 3·53 cubic feet.

No perceptible variation was noted in Frankenholz, St. Ingbert, and Ruhr coals. The heating power of the gas produced from German coals, especially those from the Saar basin, was greater than that of the English, and especially of the French coals, which gave from 200 to 300 calories less. The variations in the heating power of coals from the same locality were less than those found in the quantity of gas produced and in its illuminating power, as will be seen from the following figures:—

Kind of Coal.	Heating Power of Gas. Calories.	Difference. Calories.	Variation. Per Cent.
St. Ingbert	4951—5366	415	9·0
Heinitz	5179—5466	287	5·0
Frankenholz	4760—5318	558	12·0
Saar	5388—5544	156	2·9

The three samples of St. Ingbert coal yielded an equal quantity of gas notwithstanding the difference in the calorific power. The averages of the various coals were: French, 4934 calories; German, 5195 calories; do. (Ruhr), 5050 calories; English, 5240 calories. The following figures show the illuminating power of the gas produced from the different coals:—

Kind of Coal.	Illum. Power. Hefner Units.	Difference. Hefner Units.	Variation. Per Cent.
St. Ingbert	13·0—6·5	6·5	100·0
Frankenholz	12·3—8·7	3·6	41·4
Heinitz	—	3·7	—

The average, in Hefner units, was: French coal, 7·3; German and English coal, 10·4. Thus French coals are inferior as gas producers, in respect of both illuminating and heating power, to those coming from German and English sources.

It has already been pointed out that the production of gas of high illuminating power is now of comparatively less importance than a good yield of coke. Quantity, however, is not the only thing to be considered in this matter. Due regard must be had to quality, because in the case of large works which produce more coke than they consume, it has to be sold in competition with foreign coal. The production of coke in the gas-works of Switzerland is considerable for a small country. In the year 1903, it was 188,374 metric tons. Deducting 45,638 tons used for heating the retorts, there remained 142,736 tons for sale and consumption on the works. The sale of this product in Switzerland now depends upon the extent of the foreign imports and the considerable fluctuations in price which they involve. French and English coals, and even those from the Ruhr, produce a better-looking coke than does Saar coal. On the other hand, the coke of German and English coal is of higher quality. The finer appearance and greater density of the former are often obtained at the expense of quality, as this coke contains a relatively large

quantity of ash. This was appreciated long ago; and the tests described by Herr Weiss bore out the impression. The percentage yield of coke by the three kinds of coal dealt with was: French, 69·8; German, 64·1; English, 64·2. The French coal gives a little more coke than the others; but the proportion of ash varies considerably, as will be seen from the following figures:—

Kind of Coal.	Percentage of Ash.	Kind of Coal.	Percentage of Ash.
Montrambert .	20·1	Heinitz . . .	7·7—14·00
Montmartre . .	5·7— 6·04	Nordfeld. . .	10·4—22·90
St. Ingbert . .	6·7—10·10	Frankenholz .	8·9—15·70

The variations are not so great with English and Ruhr coals.

To properly estimate the value of a gas coal, several factors have to be taken into account—viz., the yield of gas and its illuminating and heating power, and the quality of the coke. By the aid of these factors, two coefficients were arrived at by which to classify coal—one depending upon the lighting, and the other upon the heating power of the gas—and both were taken in connection with the quantity produced. The first, designated by *a*, was obtained by multiplying the volume of gas in litres per kilogramme by the illuminating power, and dividing the product by the quantity of gas used for heating the retort. The second, designated by *b*, was obtained by multiplying the same volume of gas by the calorific power, and dividing the product by 1000. The number of tests made enabled the experimenters to determine the limits between which the two coefficients must be comprised in order to justify a gas coal being regarded as of average quality. They found that *a* might vary from 1650 to 1750, and *b* from 20 to 25. They concluded that coals with coefficients lower than these limits must be regarded as bad for gas-making purposes. Of course, in the final classification, the appearance and quality of the coke have to be taken into consideration. By way of curiosity, Herr Weiss gave another rule, which he said had not only been verified by numerous observations made during the tests, but also by other experimenters, to determine the real heating power of gas. It was found that there was a certain constancy in the proportion of the lighting and the heating power; a decrease in the former to the extent of 1 Hefner unit corresponding, in round numbers, to a fall of 100 calories in the latter.

In addition to coal, some tests were made of compressed peat, which gave 356 litres of gas, having a heating power of 3230 calories, and 31·5 per cent. of coke in a pulverulent condition. The value of the coefficient *a* was 1150. By means of a sample of anthracite sent from the Federal Polytechnic School, it was demonstrated that the fuel has almost the same appearance before and after distillation. It yielded 241 litres of gas having an illuminating power of 1-7th of a Hefner unit, and a heating power of only 3725 calories. The two coefficients may be regarded as typical: $a = 897$ calories; $b = 2{\cdot}3$ calories. This was an example of a very bad gas coal. Owing to the time required for the distillation process being different for English and German coals, inconveniences arise from their admixture in the retort, unless this is done in due proportion.

In conclusion, the author said that the results arrived at were only of value for purposes of comparison; but the averages he obtained with the apparatus employed were nearer the normal conditions of working the larger the number of the tests made. It was therefore desirable that as many samples as possible should be sent in for testing, so that the object aimed at in establishing the station might be attained.

Midland Association of Gas Managers.—In addition to the technical business, the *agenda* for next Thursday's meeting of the Midland Association contains an item of exceptional interest—the presentation of a silver tea service to Mr. A. Cooke, of Oldbury, in recognition of his services to the Association as Hon. Secretary during the past three years. The President (Mr. Thomas Berridge, of Leamington) will deliver his Inaugural Address; and there will be two papers submitted. One of these consists of "Notes on the Reconstruction of a Small Gas-Works," by Mr. A. T. Harris, of Market Harborough; and the other, "A Suggestion for Increasing the Usefulness of the Midland Association of Gas Managers," by Mr. Harold E. Copp, of West Bromwich. Mr. George Helps, of Nuneaton, will introduce the subject of the Question-Box. At the close of the meeting, the members will dine together.

Lemare's Suction Gas-Producer.—According to the French specification of M. Lemare's patent, as abstracted in the "Journal of the Society of Chemical Industry," the fuel in the producer rests on a solid hearth of refractory material, which can be oscillated by means of an external handle, for the purpose of loosening the fuel. A boiler for supplying the steam required by the producer is placed in the path of the hot gases between the producer and the scrubber. The latter is built up of superposed interchangeable short cylindrical sections, provided with horizontal plates having devices for breaking up the current of gas as it ascends through the water flowing down over the plates. At the top of the scrubber the washed gas enters a chamber fitted with a spiral partition, which acts as a centrifugal purifier. The apparatus is characterized by detail modifications in the construction of the fuel-hopper, the boiler-feed, sight-holes, starting-pump, &c. The outer limb of the syphon-pipe, which admits the water to the scrubber, is of large diameter, so as to prevent air bubbles being dragged in, thus diluting the gas.

LIGHTING BY GAS AND ELECTRICITY.

The Advantages of Gas.

Before the Society of Architects, last Thursday, Mr. B. R. Tucker, late Chief Surveyor to the War Office, read a paper on the "Lighting of Buildings, &c., by Electricity and Incandescent Gas," illustrating his remarks by means of lantern slides. The chair was occupied by the President of the Society, Mr. Walter W. Thomas, of Liverpool.

In the course of his introduction, the author explained that the object of the paper was to help to create an increased interest in this most important part of an architect's duty. In employing artificial light, it was essential in the first instance to determine the amount that might be required, the mode by which it was to be measured, and the laws that governed its intensity. Taking a general average, the amount of light required for reading and writing might be taken at 1-candle power; but this depended on the nature and extent of the reflecting surfaces influencing the light. For work with much detail, or on coloured materials, a light of not less than 5 candles should be provided; and even this might be doubled for the finest mechanical work—such as engraving. After remarking on the necessity of a definite standard of light for comparison, Mr. Tucker dealt with the mode by which light is measured; first describing the legal candle standard, and then referring to photometry.

In the latter connection, he gave the following short account of the photometer invented by Messrs. Carpenter and Helps, which has been already described and illustrated in the "Journal," and is now in use by the South Metropolitan Gas Company: The standard carcel or pentane lamp, which is equal to 10 standard candles, is not compared directly with the light to be tested, but serves to fix a predetermined value to a secondary standard of the same quality and colour as the light to be tested. By this means the colour difficulty is overcome. The light of the secondary standard is adjusted by a sliding shutter worked by a fine screw, so as to produce the same amount of light as the standard lamp. Two divided scale-bars are used, having a terminal common to both at the secondary standard. The primary scale is provided with a moveable screen box containing a reversible Leeson star disc; the scale on the bar being divided equally from the centre towards the primary and secondary standards. The secondary standard rotates, that it may occupy the same relative position either way. On the secondary bar is mounted a reversible bunsen disc-box, and at the other terminal the light to be tested. The disc-box having been adjusted, the intensity of the light being tested may be decided by the square of the difference in the distance between the secondary standard light and the disc-box.

The law of inverse squares, said the author, proved that, in order to obtain the best result with economy in lighting, it was necessary, in the case of a large room or building or church, that it should be illuminated by means of a reasonable number of separate lights, judiciously distributed, instead of by a large single light or lights placed centrally. Though it was somewhat difficult to lay down any definite rule for the placing of lights, it might be taken that, as the purpose of lighting was generally to produce a certain intensity of light at the plane of illumination (which was usually assumed to be from 3 to 4 feet above the floor), the lights should be so placed, and of such a nature as to produce a minimum illumination of about 1-candle power at the parts farthest from the source. The "plane of illumination," he added, was just where a person would be reading. They might reckon about 1 candle light per foot of superficial area; but where there was a very large amount of reflection, it was possible to do with ½ candle. The best artificial light was a soft, steady, well-diffused one (which was usually obtained by employing ground-glass globes, &c., of different patterns), and the one which most nearly approached in colour to natural light—which was not perfectly white, but yellowish white.

The author next gave descriptions of the three kinds of electric lights—arc (open and enclosed), Nernst, incandescent. Dealing with enclosed arcs for interior lighting, he pointed out that opal globes absorbed from 50 to 60 per cent. of the light, ground glass from 30 to 50 per cent., and clear glass about 10 per cent. From this, it would be seen how wasteful was the usual method of diffusing the light by opal and ground globes. It was only necessary to disperse the downward rays by such globes; the upward rays should be unobstructed, and reflected downwards by means of an umbrella-like shade. In studios, factories, &c., arc lamps of the inverted type were used, the rays of which were thrown on a white ceiling and reflected, thus producing a most pleasing effect. Before leaving this portion of his subject, Mr. Tucker gave a good illustration of the confusing method of charges so frequently adopted for electricity. The rate per unit for electrical current in the City varies from 2½d. to 5d.; and in one business house he knows of, 2½d. is charged per unit for current used in the daytime in the basement, 3½d. for that used on the ground floor, and 4½d. for the floors above. Speaking of arc street lamps, he said that during the fogs last November at Clapham, he could not when standing at one arc lamp see the next; but the moment he turned into a street lighted by incandescent gas, he could see two lights ahead. The difference in penetrative power between the two

systems was largely to be accounted for by the fact that with the arc the light was thrown down in a circle. Until it was possible to send all the rays out horizontally, he did not think that in foggy weather anyone would feel safe with arc lights unless they were very close together.

Under the heading of incandescent gas lighting, the author, after explaining the system, made some interesting remarks. He said that the incandescent "C" burner was five times as efficient as an argand burner, six times as efficient as an ordinary burner, and three times as efficient as a regenerative burner. Mantles should not be kept in stock for any length of time, as they deteriorated by the action of the oxygen of the atmosphere. Very much depended on the description of shade used with incandescent burners. The object should be to soften the light, and approximate it in colour to that of natural light. Care should be taken that the mantles were perfect, as sometimes the slightly defective ones known as "seconds" were sold as perfect. Seconds were the result of the sorting out, and consisted of those short in length, with stitches dropped in the knitting, or having other deformation and damage. Natural ventilation was very much improved by the use of incandescent gas lighting. The heat of the burners not only caused a healthful circulation of the air in the building, but it materially assisted in the removal of the vitiated air in all cases where proper provision was made for escape; while it undoubtedly helped to prevent down-draught in certain cases in churches, halls, large rooms, &c. Bye-pass burners should be used; and if they produced an unpleasant smell, this could be remedied by reducing the flame to a small blue light only.

In support of these statements, Mr. Tucker referred to the experiments carried out in 1902 (and fully reported in the "JOURNAL" at the time) by Professor Percy F. Frankland at the Birmingham Museum and Art Gallery, which showed the following results under the condition of the efficient ventilation which prevailed at the time: (*a*) In the absence of any artificial illumination, there was a slight increase in the percentage of carbonic acid in the air during the course of the day; (*b*) with electric arc lamps, this increase was distinctly more marked; (*c*) but with incandescent gas, there was a distinct diminution in the percentage. This diminution, it was stated, was obviously due to the more efficient ventilation of the gallery caused by the greater draught of heated air through the ventilating shafts placed over the burners. The author pointed out that the circumstance that the percentage of carbonic acid actually diminished during the use of incandescent gas-burners proved that the products of combustion (from which damage to pictures might be apprehended) were completely carried off by the ventilation which was so much promoted by the burners. Professor Frankland preferred the incandescent gas installation in the Birmingham Art Gallery to electric arc lamps; but Mr. Tucker emphasized the fact that, in order to secure the advantages of this system, it was necessary that proper ventilation should be provided over the burners, to prevent the circulation of the products of combustion.

The author concluded by giving descriptions of the various forms of incandescent gas-lamps now on the market; and these were rendered much more easily understandable than would otherwise have been the case by means of the views thrown on the screen. Some of the most interesting slides were those showing the Carpenter-Helps photometer, the lighting of the chemical laboratories at the South Metropolitan Gas-Works, and the Keith lamps at the Mansion House and Covent Garden Market. The different styles of electric lamps were also illustrated in a similar manner. Mr. Tucker acknowledged the assistance he had obtained from Mr. Carpenter in the preparation of his paper.

In proposing a vote of thanks to the author for his paper, Mr. J. R. Manning said that in Paris, where he had seen one Avenue lighted by electricity and another by incandescent gas, he had noticed that standing at a distance there was decidedly far more light coming from the gas than from the electric lamps. He would like to know the relative cost of an ordinary gas-light of (say) 8-candle power, as compared with an incandescent gas light and an electric light of the same power. He had often asked for this, but could not get a satisfactory reply.

The vote was seconded by Mr. H. H. Richardson, who confessed that when the electric light was first introduced he thought they were going to have a great revolution in illumination; but, so far as he was able to judge, this had not been realized. He went into places lighted by the electric light, and found as much difficulty in reading as he had previously experienced with gas-light. He hoped that some invention might arise by which electricity would be made more powerful for indoor lighting. Then for outside purposes electricity was certainly lacking in what he might call "dispersive" power. In time of fog it was practically useless. As to its cost for street lighting in comparison with gas, he might say that for many years he was a member of one of the old London Vestries, who made it their duty to investigate the question. They found that the cost of a gas-lamp was very much less than that of an electric lamp; and with the later improvements, gas compared still better now than it did then. Electricity was more suitable for underground rooms (where light was needed without heating the air), and as a means of decoration, than for giving a generally useful light. He did not believe they could get a better light than that furnished by the incandescent mantle; and it was infinitely cheaper than electricity.

The next speaker was Mr. R. F. Vallance, who said he was very much surprised at the statement in the paper that in a room lighted by electricity there was more carbonic acid found than in one lighted by gas. From his own personal experience, he much preferred electric light for dwellings to incandescent gas. Possibly if they had a ventilating shaft for each burner to carry off the products, they might get very perfect ventilation with gas; but with the electric light one felt very much better in the morning than after sitting up till the early hours with gas. For street lighting, however, he was very much in favour of incandescent gas. The shadows thrown by the electric lamps were to his mind a very great disadvantage; and up to the present time there had not been brought out an electric lamp which diffused the light in the same way that incandescent gas did. As to relative cost, there was no doubt electricity was the dearer—at least, this was the case in his part of the country, where they had the maximum demand system. This meant that they paid 7d. per unit for the first 100 hours in each quarter, and 2d. per unit for all beyond; and in his own house it worked out to about 5d. per unit all round. This, in comparison to gas, meant that the expense of lighting the premises by electricity was a good many pounds more. Very great improvements had been made latterly, particularly in gas-lamps; and possibly this was owing to the fact that gas engineers had been put on their mettle by the adoption of electricity in many instances. He hoped that gas would still hold its own.

The case for electricity was ably put by Mr. E. T. Ruthven Murray, who, in the course of a lengthy speech, remarked that the Carpenter and Helps photometer did not altogether get over the great difficulty of colour. It was exceedingly difficult to measure an ordinary arc lamp, which had a slightly blueish tinge, with the ghastly green of incandescent gas, and the somewhat pale yellow of the ordinary incandescent electric lamp, and the brilliant golden yellow of the newer types of arc lamps—the first of which was the Bremmer. Little had been said with regard to the colours of the lights; yet this was one of the most important points. It was a striking experiment to place together an ordinary incandescent electric lamp, a Nernst lamp, an arc lamp, and an incandescent gas-lamp. It would be seen that the arc lamp had a blueish look; while the incandescent electric lamp was something like the flat-flame gas-burner, but if anything rather whiter in colour. The Nernst lamp was about the purest white light that could be seen; and the incandescent gas-lamp was green, which was its chief objection, though when the mantles were new, and with the compressed gas systems, it was less noticeable. As to public lighting, if an arc lamp was suspended from a bracket over the street, they would find that the light under the lamp was about equal to what it was 20 or 30 feet away. Some arc lamps were placed too high, and others too low. They ought to be about 20 feet from the ground, and then excellent illumination was obtained over the whole street, and nothing like so patchy as with incandescent gas. With regard to enclosed arc lamps, if any of the members of the Society had a desire to see lights of this kind as near perfect as he expected they would ever get them, they should go and look at those just outside the Central London Railway, at the Bank. As to the question of fog, it must not be assumed that because they could not see the arc lamp, the light was not there. They would find that the fog was illuminated around, though they could not see the source. It was quite true the ordinary naked arc lamp was weak in its penetrative power in fog; but this did not suffice to condemn it. It was a very high compliment to electricity to see the gas people trying to turn their lamps upside down, and make their big lamps look as near like arc lights as they could. With regard to the recent Earl's Court Gas Exhibition, this was about the most magnificent advertisement that was ever given to electric lighting. Anyone who was there for two or three hours went away feeling ill. As to Professor Frankland's experiments at the Birmingham Art Gallery, he did not think much of them, because the author himself had stated that the incandescent gas-burners had funnels above them for the purpose of taking away the fumes. The ordinary 5-foot gas-burner consumed as much oxygen as ten human beings; and this had to be thought of in connection with interior lighting. He was sorry the author did not recognize how much electric lighting had done to overcome the difficulties of internal illumination and ventilation. The usual comparison of price of electric lighting and gas was to take the proportion between an ordinary flat-flame burner and an incandescent electric lamp consuming 3½ volts per candle power as eight to one; so that electricity at 3d. per unit was equal to gas at 2s. per 1000 cubic feet. Personally he found that with charges of 8d. and 1d. per unit on the maximum demand system, he got his electricity during the winter at 2¾d. per unit; and his account was two-thirds of what it would be for gas. In the summer, it came to 3¼d. per unit, which was still less than gas.

The President remarked that for the last three or four years he had been experimenting on the difference between gas and electric lighting for business premises; and there could be no question about one thing—that for commercial buildings, like shops, and so on, incandescent gas gave a better light both for the showing of goods and in regard to distribution.

In his reply, Mr. Tucker contended that unequal illumination from arc lamps was not caused by them being fixed on posts, but by the lower carbon interfering with the light. In the city they were doing away with electricity for public lighting, and were

substituting incandescent gas; at Liverpool the same thing happened. People did not do this without reason; but there was no doubt that each light was preferable for certain purposes. With arc lamps, the rays of light were discharged at an angle of 40° below the horizontal; and consequently the light was affected when they got beyond a radius of about 30 feet of the lamp. At any rate, it was so at Battersea. As to the Birmingham Art Gallery tests, he was merely quoting Professor Frankland; and he always assumed that, with any buildings architects constructed, they ought to provide for natural ventilation. The question of comparative cost was a rather difficult one; but there was a saving by using incandescent gas, unless Nernst lamps were employed, which he thought ran it pretty close. He did not believe that they had got to the end of incandescent gas lighting; and, on the other hand, he did not consider that they would not in the future see some vast improvement in electric lamps. Perhaps the light they now enjoyed was mere dimness to what they would have in days to come. The first thing for electricians to do was to provide a lamp that would penetrate fog.

The vote of thanks was heartily accorded.

GAS v. ARC LAMPS FOR STREET LIGHTING.

At the last Monthly Meeting of the Glasgow Section of the Institution of Electrical Engineers, the discussion was continued of Mr. H. B. Maxwell's paper on "Street Lighting by Electric Arc Lamps" (*ante*, p. 168).

Mr. W. A. CHAMEN, in the course of a lengthy communication, said that it was only to be expected they should come into sharp conflict with their friends the gas engineers over the matter of street lighting. A few years ago, gas people asserted that street lighting was a very poor business—that there was nothing in it, and that it did not pay. It was very remarkable that so much trouble should be taken by them to fight, inch by inch, the progress of electric lighting in the streets, and to prevent this unsatisfactory consumer from transferring business elsewhere. It was doubtless another of those cases where business was carried on at a loss, and the only reason that it paid was because of the enormous quantity of it. Mr. Wilson took up the usual argument used against the arc lamp for street illumination—viz., that it gave intense illumination within a certain area, and, on account of the distance of the lamps apart, patches of comparative darkness in between. He (Mr. Chamen) had the pleasure of residing at Jordanhill for a couple of months recently, and could only say that, to his prejudiced eyes, the arc lighting, even with the lamps at long distances apart, was for a quiet suburban district very satisfactory, and much more pleasing than the gas arrangements in Glasgow. It was worth noting that, though the "patchy" nature of arc lighting was complained of by Mr. Wilson, they found gas engineers themselves striving hard to introduce lamps of high candle power—as, for instance, in Whitehall, London; and Mr. Wilson himself spoke of them as being erected in the new thoroughfare between the Strand and Holborn. It therefore seemed to him (Mr. Chamen) that the particular point which worried the soul of the gas engineer in this "patchy" business was not so much darkness between the arc lamps as the brilliancy around them; and when he could produce a 1000 or 1500 candle power gas-lamp on a pillar 20 or 25 feet high at as low a cost as electricians could supply arc lamps, he would have forgotten all about the "patches" in between. Mr. Wilson also referred to Brighton; but it should be remembered that in Brighton old-fashioned flat-flame gas-burners were replaced, in bye-streets, by ordinary incandescent electric lamps before the incandescent gas-mantle fairy had cast her magic spell upon so many moths. The main streets and the promenade of Brighton were lighted by arc lamps, and splendidly lighted, too. There was, however, plenty of work for their gas friends to do. By all means let them get all flat-flame burners in bye-streets (where no electric mains were laid) converted to the incandescent system, so that at any rate the light might be sufficient to prevent evening wanderers from coming into accidental collision with the lamp-pillars. But when they came to main streets, where a high standard of illumination was wanted, he thought arc lamps must be used. In conclusion, there was the old argument about fog. He did not see that a gas-mantle could pierce a fog any better than an arc lamp. If they lived in perpetual fog, red flaming coal-fires or "Lucigen" or "Wells" oil-lights would be the only thing to do much good.

Mr. M'Whirter also dealt at considerable length with Mr. Wilson's remarks, and Mr. Maxwell made a long reply.

The Proposed Ministry of Commerce.—It appears that the new Ministry of Commerce will amount practically to a reconstruction of the Board of Trade. There will be a Central Board, with separate departments for marine, railways, trade, and industry; and the Home Office will delegate its duties with regard to certain of these matters to the new Department. The Minister of Commerce will have the standing of a first-class servant of the Crown, with a salary of £5000 a year; and trade is thus to be assigned a leading position in the Cabinet. If the necessary Act of Parliament should be carried in the present session, it is thought the first Minister of the Department will be Mr. Bonar Law, the Parliamentary Secretary to the Board of Trade.

NEW RESERVOIR AND TOWER AT WALLASEY.

The new covered service reservoir and water-tower recently constructed for the Wallasey Urban District Council, to which reference was made in the "JOURNAL" last week (p. 444), were formally brought into use on Saturday. The event, it may be said, had been anxiously awaited by a number of the inhabitants, because it meant the realization of a much-desired necessity—a plentiful supply of water.

Wallasey has indeed grown at a very rapid rate over the past two decades; and as the time had arrived when further water storage accommodation had become desirable, the Engineer (Mr. J. H. Crowther) suggested that, when preparing his plans for the new reservoir, a second tower, the top water level of which was proposed to be 245 feet above Ordnance Datum and 35 feet above the existing structure, should be erected, in order to provide an adequate pressure at all parts of the district. The recommendation was approved, and the tower embodied in the scheme of extensions. A commencement was made in September, 1902; so that the work has been in progress rather less than 2½ years.

The reservoir is constructed on Gorsehill, New Brighton, immediately adjoining the one erected in 1886. For a portion of its area it is rectangular in shape, with a "break" towards Gorsehill Road; making the whole area on plan L shape. The inside dimensions are: Length, 312 ft. 6 in. by 92 ft. 2 in. and 148 ft. by 47 ft. 3 in. respectively, having a depth of 20 ft. 6 in. to the springing of the crown arches, or, from the bottom of excavation to the crown, 26 ft. 6 in. The surface area is 35,818 superficial feet, and the containing capacity about 4½ million gallons.

During the course of the work, it was necessary to remove 30,000 cubic yards of yellow sandstone; and as blasting operations could only be conducted on a very small scale, owing to the close proximity of houses, a considerable amount of time was necessary on this section of the work. Following on the dressing of the sawn faces of the rock excavation, a 9-inch wall, springing from an inverted arch, was built in engineering bricks, so as to form a cavity; the latter then being run in with cement grouting. At a distance of a yard apart, longitudinally and vertically, this wall is provided with wrought-iron ties for receiving the pure bitumen lining and for bonding the glazed 4½-inch brick face work, which forms the inside of the finished reservoir walls. These walls are slightly battered in the total height of 20 ft. 6 in. The sheeting used was Callender's, of ¼-inch thickness; and the material was also carried across the floor of the reservoir between two 6-inch layers of concrete.

The arching of the crown, which is carried out in local machine-made bricks built in cement mortar, is formed of nine and six spans (to suit the shape of the reservoir); each span being 14 ft. 6 in., with a rise of 2 ft. 6 in. and a depth of 14½ inches. The crown arches are supported by steel girders to the number of 83, each 25 ft. long by 2 ft. deep by 18 in. wide. These girders extend in sections longitudinally for the whole length of the reservoir, and are securely tied to the outer walls by a series of wrought-iron ties bolted to heavy wrought-iron plates, each 2 ft. by 2 ft. square, and evenly screwed home so as to resist any undue strain on the springing. The girders are placed on heavy stone blocks and steel seatings built on to the brick piers supporting the crown. There are 75 of these piers, of the average dimensions of 3 ft. 1 in. by 3 ft. 1 in. The outer retaining walls are executed in concrete upon a rock foundation, and faced with stone taken from the excavation. These walls have an average thickness of 4 ft. 8 in., and are finished with a heavy coping and plinth.

The pit containing the working pipes, valves, &c., is formed inside the new reservoir, and distant some 40 feet from the one adjoining. A tunnel 125 yards in length, excavated out of the solid rock, and arched over with brickwork, connects the new reservoir with the old. This tunnel contains a 24-inch balancing pipe, and a 9-inch pipe for draining off the new reservoir when required. The pipes are fitted with valves in suitable positions for regulating the level of water in both reservoirs, and have fixed at their extremities cast-iron straining caps to prevent silt getting to the valves. It may be said of this reservoir that, while sight has not been lost for a moment of the main feature—utility—every effort has been made, consistent with cost, to construct works which would not be an eyesore and a detriment to the surrounding property. To this end embankments have been formed round, and suitably planted with shrubs; and where the works front Gorsehill Road, a well-finished boundary wall and neat railing has been erected.

The tower which, as we have said, has been constructed to obtain sufficient head to afford the houses adjoining and others at equally high points an adequate supply at all times, is erected in the "break" of the reservoir, and is octagonal in form. When excavating for the tower foundations, some deviation from the plans in the matter of depth had to be made. There had been every surface indication of sound rock being found at the proposed depth; but, during the progress of excavating on the adjoining reservoir, a bed of clay some 2 ft. 6 in. thick, sandwiched between rock, was discovered. It was therefore necessary that these foundations should be carried to a greater depth than originally intended, and to the solid rock. To lessen the increased cost as much as possible, the excavation was stepped.

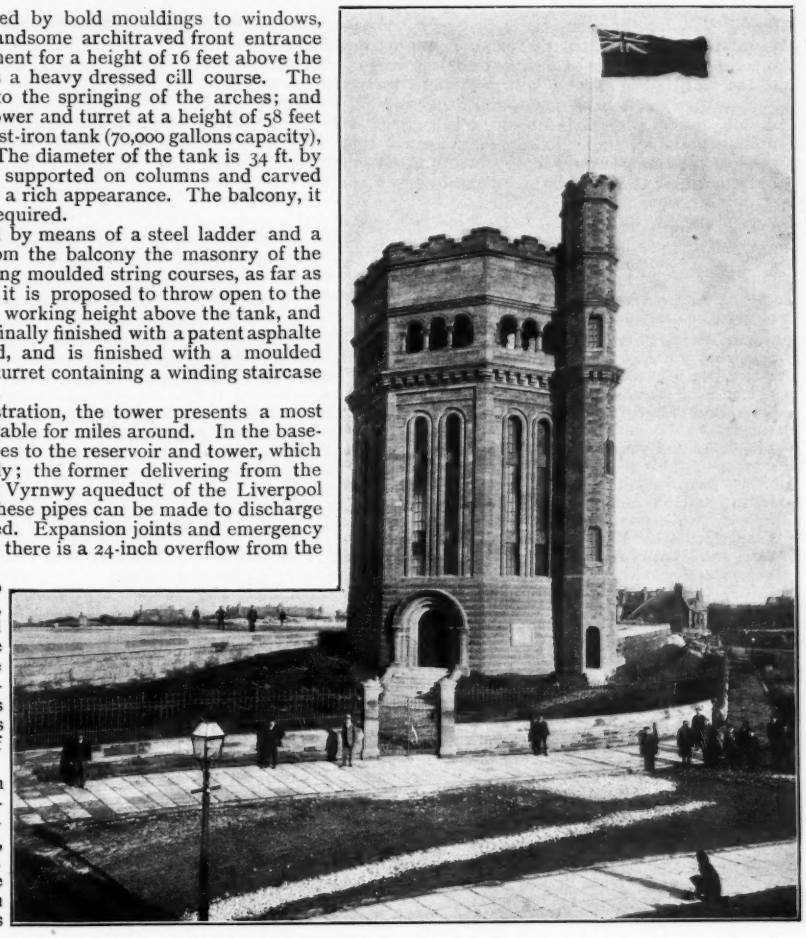
The tower is built of Runcorn stone enlivened by bold mouldings to windows, mullions, and cornices throughout, and has a handsome architraved front entrance door. Heavy coursed masonry forms the basement for a height of 16 feet above the footings, and above this rock-freed work there is a heavy dressed cill course. The windows, of which there are sixteen, are 25 feet to the springing of the arches; and above these a bold cornice is carried round both tower and turret at a height of 58 feet above the roadway. At this level is placed the cast-iron tank (70,000 gallons capacity), carried on ten lattice girders each 2 feet deep. The diameter of the tank is 34 ft. by 12 ft. 6 in. deep. Twenty-four balcony arches, supported on columns and carved capitals, enclose the tank, and give the structure a rich appearance. The balcony, it is intended, shall be used for any painting, &c., required.

Access to the tank from the inside is afforded by means of a steel ladder and a hatchway built into the surrounding floor. From the balcony the masonry of the tower is carried up in plain work, with intervening moulded string courses, as far as the level of the platform. This platform, which it is proposed to throw open to the public, is formed of heavy steel girders fixed at a working height above the tank, and covered with expanded metal and concrete, and finally finished with a patent asphalte flooring. It has a 4 ft. 6 in. parapet all round, and is finished with a moulded embattlement. Access to it is gained by a neat turret containing a winding staircase and finished off in a manner similar to the tower.

As will be seen from the accompanying illustration, the tower presents a most imposing appearance; its bold lines being observable for miles around. In the basement are fixed the valves controlling the inlet pipes to the reservoir and tower, which are 18 inches and 21 inches diameter respectively; the former delivering from the Liscard pumping-station, and the latter from the Vyrnwy aqueduct of the Liverpool Corporation. The valves are so arranged that these pipes can be made to discharge either into the tower or the reservoir as required. Expansion joints and emergency bye-passes have been fitted to these pipes; and there is a 24-inch overflow from the tank to the reservoir without valve.

Upwards of 8500 cubic yards of concrete, 1600 tons of cement, 1,000,000 bricks (common, glazed, and engineering), 18,000 cubic feet of stone, and 300 tons of iron and steel work were used in the carrying out of the contract. The works have been well executed by Mr. John Gourley, Contractor, of Liscard and Liverpool, to the designs and specification of Mr. J. H. Crowther, the Gas and Water Engineer to the Council, at a cost of rather less than £28,000.

Wallasey is to be congratulated upon being in possession of an abundant supply of pure, wholesome water; and with the undoubted natural advantages which it possesses as a residential district, there should be no bar to its continued prosperity. Up to within a comparatively recent period, the Council relied to some extent upon two wells on the site of the gas-works at Poulton; but this source of supply has been permanently abandoned—the water there having shown marked



The Water Tower at Wallasey as Completed.

The Reservoir under Construction—September, 1904.

signs of deterioration in quality. The district is now supplied from two sources—viz., the Liscard Water-Works and the Vyrnwy aqueduct of the Liverpool Corporation; the latter costing something like £150,000.

At Liscard, there are two pumping-stations—No. 1 opened in 1894, and No. 2 in 1902. At No. 1 station, extensive boring operations and alterations to the pumping plant as originally fixed have recently been concluded under the supervision of Mr. Crowther; and this station may now be looked upon as a duplicate of No. 2, from which 2 million gallons of very excellent water can be obtained per diem. At the present time, the arrangements with the Liverpool Corporation are for the supply of 500,000 gallons of Vyrnwy water per diem; so that the resources of the Council may be said to be 2½ million gallons per diem—a

quantity more than sufficient by some 750,000 gallons for the normal requirements of the existing population, and capable of meeting the demands of a considerable increase. Having regard to the fact that Wallasey is in a position to take up to 1,000,000 gallons per diem from Liverpool any time after three months' notice, and subsequently up to the full capacity of the main (2½ million gallons), there is ample evidence that the important question of water supply for a growing place will not call for any consideration at Wallasey for some time to come.

The opening ceremony took place on Saturday afternoon, in the presence of the members of the Council, officials, and a large number of residents. Mr. Isaac Carr, of Widnes, Mr. J. W. M. Richardson, of Birkenhead, and Mr. A. G. Readdy, of Hoylake, were also present, representing the neighbouring water authorities.

Mr. Richard Steel, J.P., in the course of a short speech, dealt with the history of the Wallasey water supply, detailing the extensions which the Council had carried out from time to time to meet the demands of increasing population. In conclusion, he presented the Chairman of the Council (Mr. T. V. Burrows, J.P.) with a beautiful specimen of the silversmith's art in the shape of a key, together with an illuminated address, on behalf of the members of the Council, in consideration of his arduous efforts on the water question.

Mr. Burrows, after returning thanks, opened the door of the water-tower, and an inspection of this building and the reservoir then followed. After the reservoir had been cleared, Mr. J. R. Lloyd, the Chairman of the Water Committee, was asked to turn on the water from the Vyrnwy main into the tower, which he did, after speaking eulogistically of the services rendered to the district by the Engineer (Mr. J. H. Crowther). The proceedings were brought to a close by the Vice-Chairman (Mr. J. Kiernan) participating in the ceremony of valve-turning.

In the evening, the Chairman of the Council and the Chairman and Vice-Chairman of the Water Committee entertained the members and officials and others at dinner in the Hotel Victoria, New Brighton.

REGISTER OF PATENTS.

Manufacture of Illuminating Gas.—Duttenhofer, B., of Karlsruhe, Germany. No. 2001; Jan. 25, 1904.

This invention is based on the observation that, whereas the most valuable constituents of illuminating gas are hydrocarbons, the total proportion of hydrogen in coal is little more than 4 or 5 per cent. in gas coal—the "disposable hydrogen" in each case being approximately ½ per cent. less.

The object of the process is to increase the amount of disposable hydrogen by the addition of steam, in order to afford more material for the generation of hydrocarbons. For this purpose, it is necessary, the patentee points out, to bring the coal into contact with steam immediately at the beginning of the distillation, and to effect the distillation, as it were, in an atmosphere saturated with steam; so that the latter can from the beginning influence the decomposition of the coal. The presence of a large proportion of hydrogen is more particularly intended to prevent the formation of tar compounds rich in carbon and poor in hydrogen. The nascent hydrogen derived from the steam acts on the tarry compounds about to be formed in such a manner as to cause the formation of substances of the benzol type containing more hydrogen and forming, as already mentioned, the most valuable constituents of illuminating gas. Another important advantage of the improved process is said to consist in the fact that, owing to the reduction in the quantity of tarry substances produced, the production of carbon is considerably lessened or entirely prevented.

The patentee does not give any illustration of the plant he suggests using, but says that the process can be performed with retorts similar to those used for manufacturing illuminating gas, except that they are connected with pipes or the like for the supply of steam. Before the distillation of the coal begins, steam is admitted through the pipes, from the orifices of which it passes through the coal and the incandescent coke; the quantity and pressure of the steam and the intervals at which it is admitted being determined according to requirements. For this purpose, a steam-valve controlled by clockwork mechanism may be used; and in order that the inflow should not vary with the pressure in the steam-generator, the inflowing steam may be caused to pass through a spring-valve the aperture of which is inversely proportioned to the steam-pressure. The steam can be admitted from one or both sides of the retorts.

It has been found in practice, the inventor remarks, that up to 25 per cent. of water gas can be added to illuminating gas without detracting from the value of the latter to the consumer. Assuming that in the process described the addition of steam results solely in the formation of water gas, the quantity of steam supplied is preferably kept within such limits that the water gas produced does not exceed 25 per cent. of the total output of the gas-generator. If 100 kilos. of coal produce 28 cubic metres of illuminating gas, 7 cubic metres of water gas can be added per 100 kilos. of coal reduced. The 7 cubic metres of water gas contain 3·5 cubic metres of hydrogen, for supplying which $3{\cdot}5 \times 0{\cdot}8 = 2\,8$ kilos. of steam are required. On this approximate calculation, therefore, up to 2·8 kilos. of steam can be supplied to the retorts per 100 kilos. of coal carbonized.

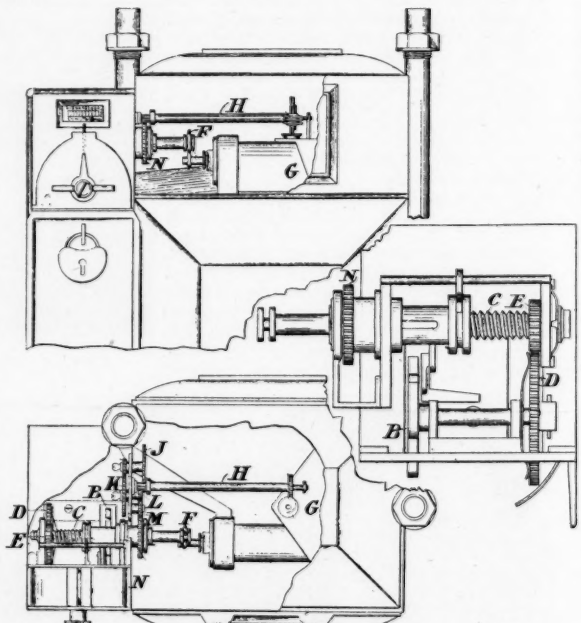
The intervals at which steam is to be admitted to the retorts are governed by the temperature of the latter—that is to say, the rate at which the steam is supplied must be such that the temperature of the generator is not reduced by the steam "to a degree unsuitable for efficient and economical working." In the case of generators worked at high temperatures, the cut-off of steam takes place less frequently, and for shorter periods, than in the case of generators worked at lower temperatures.

Prepayment Attachments for Gas-Meters.—Laidlaw, W. K., of Edinburgh. No. 3148; Feb. 9, 1904.

This invention has for its object the providing of a simple and compact arrangement of the coin-pocket and its connections with the gas-valve of the meter.

The illustrations show a front elevation of the upper portion of a prepayment meter, a plan of the meter, and an elevation of a portion of the mechanism looking from the back side of the meter.

The case containing the coin-pocket is carried on a bracket at the side of the meter. The box or cover for the pocket (of semicircular shape) is mounted on an axis, so that it can be partially rotated within the cover by a wing nut fitted on one end of the axle which protrudes through the closed side of the semi-circular cover. When the pocket is in a vertical position (as indicated by the finger), it is opposite the coin-slot in the top of the cover; and on dropping a coin through the slot, it falls into the pocket and is lodged there. Upon giving a quarter-turn to the pocket, the coin is caused to come in contact with one of (say) six teeth of a sprocket-wheel B, which rotates at right angles to the rotation of the pocket; and by continuing the rotation of the pocket, a motion of partial rotation is given to the sprocket-wheel. This gives a turn to the screwed spindle C, which is in communication with the ordinary inside gear of the meter—the coin dropping out of the pocket into the coin receptacle after it has effected the partial turning of the wheel. This connection is effected by extending the axle of the sprocket-wheel to the opposite side of the coin-pocket cover, where a toothed wheel D is mounted on the end of the sprocket-wheel spindle and gears with a pinion E formed on the end of the screwed spindle C) which extends into the meter and is connected to the ordinary meter gear. The screwed spindle carries a sleeve or nut, an extension from which carries a sliding portion to actuate the gas-inlet valve.



When the screwed spindle C is partially rotated, the sleeve or nut is caused to travel forward, carrying with it the slide which actuates the inlet valve. Before a coin is inserted in the coin-pocket, the nut is at the extreme back end of the screwed spindle C. The end of the slide is notched, so that when the slide is in this position it is engaged with the connection F of the gas inlet-valve spindle; and when a coin is inserted in the pocket and the wing-nut turned, the slide is given a move forward, which opens the gas-valve, so that gas passes from the supply pipe.

The top of the revolving coin-pocket is formed with a semicircular shaped shield; so that after the coin has been dropped into the slot and the handle turned, the coin-aperture closes, and prevents any access to the gear until the handle is turned back again for the reception of another coin within the pocket. A stop is provided within the case containing the coin-pocket to regulate the limit of the partial rotation of the pocket for each penny inserted—a projection abutting the side of the stop when turned clockwise, and another projection abutting the top of the stop when turned counter clockwise.

As the gas passes into the main gas-chamber G, it is measured; a worm imparting a motion of rotation to the spindle H, which is provided with a worm-wheel at one end and a pinion-wheel at the other end. This pinion-wheel gears with a stud toothed wheel J, which rotates a toothed wheel mounted on the same spindle—the wheel in turn gearing with the toothed wheel K, which drives the pinion L. This pinion gears with the toothed pinion M, which, in turn, gears with the toothed wheel N. The arrangement of the gearing is such that, as the gas is consumed, a sliding rod is moved backward (or to the left hand), drawing with it the valve and closing it.

The gear-wheel N and its sleeve are rotated together; but the wheel is prevented from traversing backwards and forwards by means of a collar bearing against a fixed bracket arm. To actuate the slide, a pin is fitted to the inside of the wheel sleeve, and slides backwards and forwards in the slot—thus imparting a motion of rotation to the sleeve and allowing it to travel backwards and forwards.

Preparation of Calcium Carbide.—Leinss, L., of Paris. No. 4506; Feb. 23, 1904.

This invention has for its object "to provide a preparation of calcium carbide to replace the calcium carbide hitherto used in production of acetylene gas."

Ordinary calcium carbide used in the production of acetylene gas is, the patentee remarks, very hard and difficult to break into fragments of convenient size; and it is very sensitive to the action of damp air, which causes it to emit, while being broken up, a strong odour resembling that of garlic, and to lose a considerable proportion of its gas-producing power. When it is attacked by water, the carbide forms sludgy matter like mortar, the caustic lime of which is injurious to the operator and to the apparatus used. Furthermore, the decomposition of the carbide by water is very irregular—being energetic at the start and then becoming slower, but not stopping when desired, so that there is danger, loss of material, production of objectionable odour, and waste of carbide, and the use of pressure regulators and the like are necessary, and the gas is produced irregularly, which gives rise to the production of matter which clogs the apertures in the burners. The calcium carbide prepared in accordance with the present invention, on the other hand, is said to obviate all the disadvantages, and blocks of it can be prepared in large quantity with facility and at low cost; while "they can be kept a long time without deterioration, and yield in a regular manner pure, dry, and cold gas."

The inventor mixes the following substances:—

Calcium carbide (reduced to a size of, say, from 3 to 5 millimetres) . . .	about 400 kilos.
Sugar molasses (prepared as set forth)	about 100 kilos.
Sodium carbonate (92 to 95 per cent.).	about 5 kilos.
Zinc oxide (snow white)	about 2 kilos.
Finely powdered quicklime	about 1 kilo.

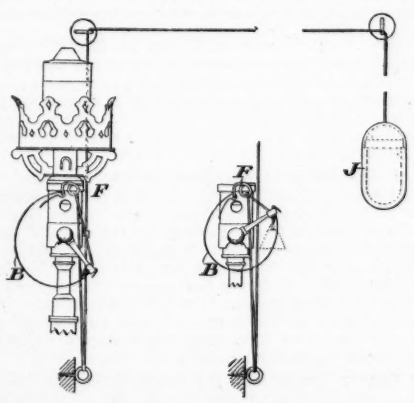
As ordinary molasses does not react sufficiently on the alkali and earth alkali compounds used, the molasses is treated as follows: Molasses (containing about 50 per cent. of sugar) is heated in a pan provided with a stirring apparatus to a temperature of about 100° C., so as to deprive it, as much as possible, of the water which it contains. Immediately afterwards potassium permanganate (in quantity equal to 5 per cent. of the weight of the molasses) is introduced into the hot molasses while it is being stirred. The appearance and consistency of the molasses become thereby altered. The sodium carbonate, the zinc oxide, and the quicklime, in a state as dry as possible, are then introduced successively, while stirring is continued. Afterwards, the granules of calcium carbide are introduced into the paste, the temperature being maintained at at least 90° C. When the mass is well agglomerated, the mixture (which quickly hardens) is removed from the pans and moulded under pressure, and the moulded product passed between rollers to polish and equalize the surface of the blocks.

According to the inventor, the blocks thus obtained are brown and very hard and dense—presenting a characteristic crystalline fracture. They are almost unaffected by steam and stable in air, but are very sensitive to the action of water, and in the producers decompose only when gas is being produced; the gas production being regular, and the pressure of the gas remaining constant and the gas being pure. The blocks emit no disagreeable odour, can be easily divided, and do not form sludge or mortar-like residues.

Controlling Gas-Burners from Points away from the Burner.—Kearney, E. W. C., of Lavender Hill, S.W. No. 5232; March 3, 1904.

This invention has for its object "to overcome the inconvenience attending the usual method of lighting gas and controlling the supply, where it is necessary to approach the gas-burner in order to turn on and regulate the supply of gas."

As a means of ensuring the control of the gas-tap in all positions, there is a spring, one end of which may be attached to the burner and the other end to the lever or bye-pass arm of the tap, which has a cord or wire passing over pulleys, and connected to a weight or lever—by which the spring controlled bye-pass arm or lever may be operated.



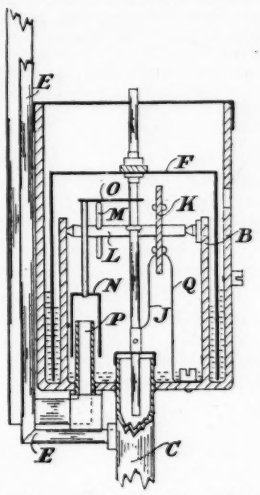
In the particular arrangement shown, the spring B has hooked ends—one adapted to be inserted through the hole in, or formed in the end of, the bye-pass arm E, and to engage with the end as shown, the other adapted to be slipped over, and thereby engage with the straight portion of a curved wire loop F connected with a clip fastened round the burner casing. To the bye-pass arm is also attached one end of a cord, which is passed round the loop F and through screw eyes, fixed at convenient points, until the other end of the cord (in any desired position) is connected to a weight or counterpoise J to counterbalance the spring B, so that in operation a gentle pull given to such counterpoise will raise the bye-pass arm and turn the light partially or full on as desired; while to extinguish the light the lifting of the counterpoise permits the spring to return the bye-pass arm to its off position.

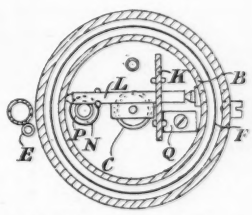
As an alternative arrangement, a weight (shown in dotted outline) may be suspended from the bye-pass arm to operate with, or in lieu of, a spring if desired.

Lighting and Extinguishing Gas-Lights Controlled by the Gas Pressure.—Haenke, M. W., of Ipswich, Queensland. No. 27,614; Dec. 17, 1904.

This invention relates to apparatus for shutting off or admitting the flow of gas to gas-lamps—more particularly to street gas-lamps, but also applicable for use in warehouses, public buildings, and other places where a number of lamps are employed, and where means are adopted for controlling the pressure of gas in the supply pipes, independent of the control by the gas-works.

The outer cylinder of the regulator forms, in conjunction with an inner cylinder B, an annulus to contain a mercury seal. C is a pipe screwed into the bottom of the cylinder and projecting sufficiently above the floor level to prevent the mercury flowing into it. Screwed into the pipe C is a pipe E for conveying gas to the pilot burner. F is a bell rising and falling in the mercury seal, fastened to which is a vertical spindle which works through a hole in the crown and in the bridge on top of the supply pipe C. L is a spindle working upon centres fixed to the wall of the inner cylinder.



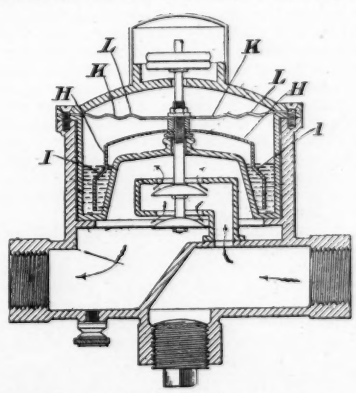


The apparatus is screwed on to the existing lamp-posts, and the entering gas fills the bell F at normal pressure; the weight of the bell being adjusted to remain stationary at that pressure. To light the lamp, the pressure at the gas-works is temporarily increased by any suitable means. When the bell F rises, the spring J, attached to the central spindle, engages with one of the projecting pins on the disc K, which rotates one-quarter of a revolution, the collar on the spindle L engages with the arm or head O when the small bell N rises—thus allowing the gas to enter the pipe P and thence to flow to the burner. The pilot-jet being always alight, the lamp is lit. The gas at the works is then reduced to normal pressure, when the bell F falls to the original position; but the pin M, which supports the small bell N, and the disc K, are prevented turning backwards by the spring Q.

To extinguish the lamp, the pressure at the works is temporarily increased, when the bell F immediately rises, turning the disc K and pin M one-quarter of a revolution; and there being now no support for the head or arm O, it falls—the bell N dipping into the mercury so as to shut off the supply of gas. The pressure is then reduced, when the bell F falls again to its original position, and when pressure is again increased rises and lifts the small bell for relighting the lamp. Each time the pressure at the works is temporarily increased, the disc K and pin M are turned round one-quarter of a revolution, alternately raising and lowering the bell N and thus lighting or extinguishing the lamps.

Gas-Governors.—Stott, J., of Oldham. No. 25,420; Nov. 22, 1904.

The patentee proposes to construct the bell or float H of the governor with an angled or bevel portion I on the side and between the top and bottom. This gives a greater area to the bell, as it is lifted out of the mercury and overcomes the loss of pressure occasioned by the further immersion of the float in the mercury—the extra surface presented to the pressure of gas on the bevel portion compensating for the increased weight of the float as it rises out of the mercury. Greater uniformity of pressure is thus said to be secured, whether the flow be large

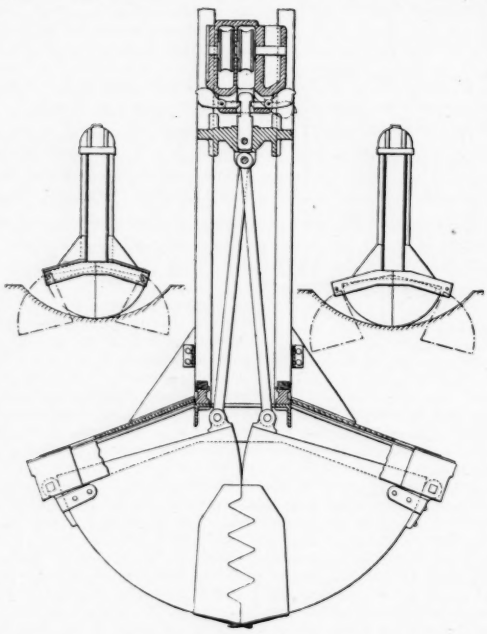


or small through the governor. Between the cover and the top of the mercury trough, and also to the spindle, is fitted a diaphragm K, of leather, rubber, silk, or other suitable material, shaped as shown at L, so as to prevent leakage of the mercury should the governor ever be placed out of level during transit. Further, the diaphragm K will, it is claimed, prevent pulsation, particularly in districts where gas-engines are largely used.

Grabs.—Hone, G.J., of Forest Gate, Essex, and the Thames Ironworks, Shipbuilding, and Engineering Company, Limited, of Canning Town. No. 28,289; Dec. 23, 1904.

This is an improvement in grabs of the kind described in patent No. 20,975 of 1894.

The chief feature of the present invention comprises some novel gear for discharging the grab automatically at any desired point without the employment of the discharging ring, lever, tumbler pin, or oil cylinder described in the earlier patent. The vertical pin attached to the cross-head is provided with one or more lateral slots or notches with each of which engages a pawl or catch loosely mounted on a hinge-pin held in the sheave block, and each of which also loosely carries a balance weight. The pawls and the balance weights are made with co-acting faces, whereby the pawls are prevented from falling into a position below the plane of the bottom of the balance-weights, but are not confined in their upward movement.



The balance-weights normally tend to hold the pawls in their uppermost position, and fixed stops are provided on the frame of the grab to relieve the pawls from the weights when the former are to engage with the notches in the pins.

A further feature of the invention consists in attaching the buckets to the grab frame by external hinges. By this means, it is said that, not only is it possible to employ short hinge-pins, but the extent to which the grab can be opened is materially increased. The detailed diagrams show, left and right, respectively, the ordinary and the improved method of mounting the grab-buckets.

Incandescence Gas-Burners.—Hubert, H. M., of Paris. No. 6850; March 21, 1904.

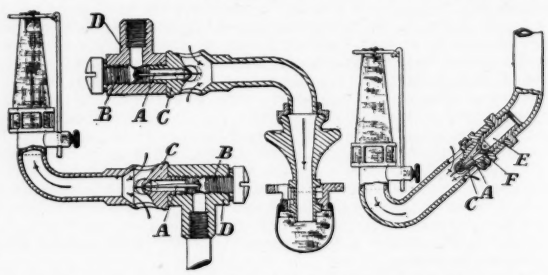
The regulation of incandescence gas-burners, the patentee points out—in particular for small consumption—presents considerable difficulties; and if the precision necessary for perfect action is to be obtained, numerous experimental trials are required before arriving at a perfectly satisfactory result. The present invention consists mainly in making the orifice for the issue of the gas of larger area than is required for the gas supply, and obstructing the orifice to a greater or less extent by an adjustable needle or tapering rod made to project centrally into it to a greater or less extent. By this construction, one injector may "be made to serve for burners differing widely as to their gas supply; also it is possible to employ for the construction of the injectors materials—such as steatite, porcelain, or other bad heat conductors—that only expand slightly under heat."

Three different arrangements of incandescence burners constructed according to the invention are shown.

The first is a burner with the burner-head and mantle upward, while the injector nozzle is in a fixed horizontal position; the regulating needle being adjustable. The second shows the same arrangement of the injector nozzle and needle with the burner-head and mantle directed downwards. The third shows an arrangement in which the regulating needle is fixed and the injector nozzle is adjustable.

In the first and second arrangements, the regulating rod or needle A, which is slightly tapered, is fixed in the conical end of a screw plug B screwed into the end piece D of the bunsen tube, which has a lateral branch screwed on to the gas-supply pipe. The needle projects into the orifice of the injector C so as to more or less obstruct it, according as the plug is screwed more or less inwards, so that by this means the area of the orifice can be accurately regulated within wide limits.

Where the burner-tube is arranged as a continuation of the gas supply-pipe, so that the regulating needle could not be adjusted by a screw plug from the outside, the needle is arranged (as in the third plan) so as to be fixed; while the injector nozzle is capable of adjustment from the outside relatively to the needle. For this purpose, the nozzle C is formed as a separate piece so connected to the burner-tube that it can be turned relatively to it by means of its cylindrical part.



This part is internally threaded, and is screwed upon the external thread of a tubular piece E, which carries the regulating needle A at its front end—this being provided with perforations F for the passage of the gas. The rear open end of the piece E is screwed tight into the end of the gas supply-pipe, so that the gas passes thence through E and through the perforations F into the injector nozzle C. It will be seen that, by turning the latter, the nozzle is screwed forward or backward relatively to the needle, thereby adjusting the area of its annular orifice to the exact amount required. When the nozzle has been so adjusted, it is locked in position by a lock-nut screwed upon the plug E.

APPLICATIONS FOR LETTERS PATENT.

435A.—Glasscoe, T. H., "Burners." Jan. 8.
2291.—Cox, G. J., "Gas-griller." Feb. 6.
2292.—Cox, G. J., "Atmospheric burners." Feb. 6.
2321.—Goodridge, R. H., "Incandescent lighting." Feb. 6.
2322.—Carley, A. T., "Incandescent burners." Feb. 6.
2344.—Brophy, M. M., "Atmospheric burners." Feb. 6.
2397.—Belton, J. C., "Coke-barrows." Feb. 7.
2495.—Hill, G., "Ignition of gas." Feb. 8.
2507.—Baxendale, W., "Gas-fittings." Feb. 8.
2553.—Hinton, E., and Andrews, F. A., "Dust-arrester for use with gas-lamps." Feb. 8.
2564.—Tcherniac, J., "Manufacture of sulpho-cyanides from crude coal gas." Feb. 8.
2684.—The Chalk Power Gas Syndicate, Ltd., and Stoneham, H. S., "Lime-burning and the recovery of power gas as a by-product." Feb. 9.
2689.—Belin, G., "Gas signs." Feb. 9.
2697.—Wolff, L., "Inverted incandescent gas-lamps." Feb. 9.
2714-5.—Southgate, R. W., & F., "Gas-fittings." Feb. 10.
2718.—Roberts, W., "Gas-saver." Feb. 10.
2733.—Helps, G., "Gas fittings and burners for inverted mantles." Feb. 10.
2735.—Camelinat, E. G., "Inverted incandescent burners." Feb. 10.
2770.—Howorth, F. W. "Carburetting air." A communication from H. Reeser, J. G. Schmidinger, and C. Philippe. Feb. 10.
2805.—Helps, G., "Gas fittings and burners for inverted mantles." Feb. 11.
2834.—Sutherland, W. C., "Prepayment meters." Feb. 11.
2840.—Pettigrew, G., "Sulphate of ammonia saturator." Feb. 11.
2876.—Chambolle, A., "Water or gas cocks." Feb. 11.

Satisfaction with Incandescent Gas at Heaton Norris.—The Heaton Norris Urban District Council are extremely satisfied with the first year's public lighting on the incandescent gas system; and a sum of money has been granted to the Surveyor (Mr. Banks) for extra services rendered in connection with the matter. The ratepayers have now three times as much light as formerly; while there has been no addition to the cost.

Depth of Gas-Mains in Wandsworth.—At the meeting of the Wandsworth Borough Council last Wednesday, a letter was read from the Resident Engineer of the Wandsworth and Putney Gas Company (Mr. H. O. Carr), relative to a request from the Council that a proposed gas-main in Revelstoke Road, Wandsworth, should be laid at a minimum depth of 2 feet under the footpath. The Engineer submitted that a depth of 18 inches in the case of footpaths and 2 feet in the case of roads would be ample. The Council resolved to adhere to their former resolution, requiring mains in new streets laid out but not taken over to be placed at a depth of not less than 2 ft. 6 in. under carriageways and 2 feet under footpaths.

London County Council and the South Suburban Gas Bill.—At the meeting of the London County Council last Tuesday, Mr. Shepheard, the Vice-Chairman of the Parliamentary Committee, moved that the Council should oppose the Bill of the South Suburban Gas Company, and that the costs should be paid out of the county fund. Mr. Whitaker Thompson asked whether this was merely a formal motion in order that the Council might have authority to petition against clauses, or whether it would cover a petition against the preamble. Mr. Shepheard replied that in all these matters the Council had already approved of the opposition. He was simply taking a vote in order that the expenses might be charged on the county fund. There was no new principle involved in it. The motion was agreed to.

CORRESPONDENCE.

[*We are not responsible for opinions expressed by Correspondents.*]

Mr. Marshall and Mr. Graham's Solicitors.

SIR,—Referring to the letter addressed to you by Mr. Marshall, and which appeared in your issue of Dec. 20, in which certain observations were made by Mr. Marshall with regard to our correspondence, we beg to inform you that we have received a suitable letter, expressing his regret, from Mr. Marshall, for having drawn our name, as Solicitors, into the correspondence.

65, *London Wall, E.C , Feb.* 17, 1905. SPYER AND SONS.

Systems of Testing Illuminating Gas.

SIR,—I thank Mr. H. Leicester Greville for his comments upon my article, "Systems of Testing Illuminating Gas." It is true the article does not furnish any solution of the questions raised, any more than it ignores the "circumstances which alter cases" as touching the proposed legislation on gas-testing.

I quite understand the "Wandsworth" burner; and my contention is that Mr. Abady did not use the burner in accordance with the method prescribed for its use—namely, 5 feet per hour. If he did, then all I can say is that Mr. Abady did not understand his instrument called a photometer, and so it misled him in his findings. The "London" argand is such an "elastic" burner that, in spite of the rigid dimensions of construction, it gives different results for each grade of gas, depending entirely upon the amount of gas consumed by it.

Surely no one but Mr. Greville believes that the method of testing is a "compromise adopted for the sake of convenience." If this were so, why go to such great expense and trouble in order to get parliamentary sanction to the method desired by any particular company? Mr. Greville knows quite as well as I do that it has for its chief object the cheapening of gas, so that a gas company may be in the position to sell cheaply a gas most suitable to the requirements of its consumers of to-day, and in the future as far as one can reasonably foresee. The past systems should be forgotten, because all our methods have changed and (need I say) for the better.

The point raised by Mr. Greville, touching the development of light from carbon particles, does not bear upon the point at issue in the way, I am afraid, he would have me believe.

As to Mr. Abady's communication, I need only say that the points raised by me are not theoretical but practical; and the publication of a name will not clear up the difficulties presented in his lecture.

Feb. 18, 1905. CRITIC.

The Progress of Electricity.

SIR,—In reference to your criticism of the large sheet tables issued as supplements to "The Electrician," there is one small matter I would like to refer to.

In your opening remarks, you state: "The largest table measures, roughly speaking, 3 ft. by 4 ft. 6 in., and figures cover both sides of this spacious sheet. The result is that the student of the end columns has to be constantly turning his eyes back over 3 feet of statistics before he can find the town to which the figures in the columns refer. This is inconvenient; and every column one progresses accentuates the danger of error."

Is not this somewhat misleading, as we have endeavoured to provide for this by inserting three individual columns of distinct figures, so that reference can be readily made across the sheet?

Feb. 15, 1905. GEO. TUCKER.

[We have pleasure in publishing Mr. Tucker's letter. It is true that the enormous table alluded to contains the columns of reference figures mentioned by him. At the same time, we find the inconvenience, even with the reference figures, of having to turn the eye back over so much space to see to which town any particular figure refers; and this inconvenience is no doubt that of others. Inconvenience conduces to error. If the tables were presented in a more manageable form, and the names of the towns appeared at more frequent intervals, as they would do by splitting the tables up into sections, and having the towns specifically stated in each, we are confident the general opinion would be that their value was much increased.—ED. J.G.L.]

The Lady Lecturer and Teacher.

SIR,—I have read with much interest your article of the 24th ult., and the subsequent correspondence upon the question of "The Lady Lecturer and Teacher."

I agree that a thoroughly competent and practical lady might be attached to the staff of every gas company, with great advantage to both the company and its consumers. A demonstration upon the most economical method of cooking, and the proper way of cleaning the stove so as to keep it in perfect order, could be given (say) once or twice a week in the show-rooms or some room provided for the purpose. This lady could answer any questions, and advise upon any matter connected with the stove—by letter if more convenient, or visit the consumer's house by appointment if necessary.

This brings me to the subject of house-to-house visiting. I do not think this should be done without due warning being given to the consumer. In fact, in my opinion, the lady inspector should only go where invited. If the consumers were informed that they could have instruction upon the proper management of their stoves—both as regards cooking and keeping clean—I believe they would take more kindly to the scheme than if they were visited perhaps against their wishes.

I do not think that cookery lectures are "played out." I have found that in the Provinces they are very much appreciated, especially in the smaller towns. There is no doubt, however, that they should be made more practical—comprising an explanation of the manner in which the stoves should be cleaned. The arrangement and working of the stove should be explained before commencing the lesson; and, at the end, the lecturer should take it to pieces and clean it in full view of the audience. I think there is nothing undignified in this. If this were always done, I am sure there would be an improvement in the condition of the stoves. It would be a very good time and place to announce at the close of the lecture that a lady would visit any consumer's house if the consumer's name and address were given in. The programmes of these cookery lectures should be arranged to suit all classes; and the lecture should be given in the simplest and clearest manner possible. I quite agree with Mrs. Deane that it is hopeless to try to follow some cookery lectures.

I trust the correspondence which your article upon this subject has caused will have good results.

55, *Moray Road, Tollington Park, N.,* (MRS.) A. M. COLLINS.
Feb. 19, 1905.

PARLIAMENTARY INTELLIGENCE.

PRIVATE BILLS (SESSION 1905).

The sixth session of the first Parliament of King Edward the Seventh was opened by His Majesty in person, in full state, last Tuesday. As usual, the Speech from the Throne contained references to several legislative measures which the Government propose to introduce; among them being Bills to extend the Workmen's Compensation Acts, improve the status of the Local Government Board and the Board of Trade, establish a Ministry of Commerce and Industry, and amend the law with respect to Valuation Authorities and the procedure for making valuations, and also the notification of industrial accidents.

Among the Private Members' Bills, the following may be mentioned as bearing upon subjects in which readers of the "JOURNAL" are interested: Coal Mines (Weighing of Minerals) Bill, Municipal Franchise (Companies) Bill, Private Legislation Procedure (Wales) Bill, Steam Engines and Boilers (Persons in Charge) Bill, Trade Unions and Trade Disputes Bill, and Wages Boards Bill.

In accordance with the Standing Orders, the Chairmen of Committees of the two Houses have had the customary conference to determine in which House the respective Private Bills should be first considered; and they have decided that the following should originate in the Upper House:—

Abertillery Urban District Water Bill, Bangor (County Down) Water and Improvement Bill, Blackpool Improvement Bill, East Cowes Gas Bill, Hessle Gas Bill, Llandrindod Wells Urban District Council Bill, Mansfield Corporation Bill, Matlock Bath Improvement Bill, Nottingham Corporation Bill, Shepton Mallet Gas Company (Electric Lighting) Bill, Southport, Birkdale, and West Lancashire Water Board Bill, Tees Valley Water Board Bill, Torpoint Urban District Water Bill, Tralee Urban District Council Bill, Truro Water Bill, Western Valleys (Mon.) Water and Gas Bill, Whitby Urban District Council Bill.

The following Bills will therefore originate in the Commons:—

Accrington District Gas and Water Board Bill, Andover Lighting and Power Bill, Aylesbury Gas Bill, Birmingham Corporation Bill, Bolton Corporation Bill, Bootle Corporation Bill, Brentwood Gas Bill, Brockenhurst Gas Bill, Brompton, Chatham, Gillingham, and Rochester Water Bill, Budleigh Salterton Urban District Water Bill, Bury Corporation Bill, Colne Corporation Bill, Croydon Corporation Bill, Croydon Gas Bill, Epping Gas Bill, Gaslight and Coke, South Metropolitan, and Commercial Gas Companies Bill, Great Berkhampstead Gas Bill, Halifax Corporation Bill, Heckmondwike Improvement Bill, Higham and Hundred of Hoo Water Bill, Hitchin and District Gas Bill, Hythe Corporation Bill, London County Council (General Powers) Bill, London Gas Bill, Loughborough Corporation Bill, Morley Corporation Bill, North Sussex Gas Bill, Otley Gas and Improvement Bill, Rhondda Urban District Council Bill, Seaham Gas Bill, Skegness Water Bill, South Metropolitan Gas Bill, South Oxfordshire Water and Gas Bill, South Suburban Gas Bill, Stockport Corporation Bill, Sunderland and South Shields Water Bill, Swansea Corporation Bill, Thames Conservancy Bill, Walker and Wallsend Union Gas Bill, Wrexham Gas Bill.

All the Lords Bills, with the exception of the Llandrindod Wells Urban District Council Bill (which has to go before the Standing Orders Committee on a question of non-compliance) and the Shepton Mallet Gas Company (Electric Lighting) Bill, were read the first time on Friday. Petitions have been presented against the following: Abertillery Urban District Water Bill, East Cowes Gas Bill, Hessle Gas Company Bill, Llandrindod Wells Urban District Council Bill, Mansfield Corporation Bill, Matlock Bath Improvement Bill, Southport, Birkdale, and West Lancashire Water Board Bill, Torpoint Urban District Water Bill, Truro Water Bill.

In accordance with the Commons Standing Order No. 128, which requires petitions against Private Bills to be deposited on or before the 12th of February, the following (among other) petitions have been presented against the Bills named:—

Birmingham Corporation Bill, by the Monmouthshire and Radnorshire County Councils, the Hereford Corporation, and Owners of property and others using the waters of the Wye.

Croydon Gas Bill, by the Croydon Corporation and the Croydon Rural District Council.

Gaslight and Coke, South Metropolitan, and Commercial Gas Companies Bill, by the London County Council, the Battersea and Wandsworth Borough Councils, and West Ham Corporation.

London County Council (General Powers) Bill, by the Brentford, the Gaslight and Coke, and the Wandsworth and Putney Gas Companies.

London Gas Bill, by the Gaslight and Coke, South Metropolitan, and Commercial Gas Companies.

London Port and Docks Commission Bill, by the Brentford, Commercial, Dartford, Gaslight and Coke, South Metropolitan, and Wandsworth and Putney Gas Companies, the Metropolitan Water Board, and Waterside Manufacturers.

South Metropolitan Gas Bill, by the Gaslight and Coke Company, the London County Council, the West Ham Corporation, and the Battersea, Camberwell, and Wandsworth Borough Councils.

South Suburban Gas Bill, by the London County Council, the Croydon Corporation, the Camberwell, Lambeth, and Lewisham Borough Councils, and the Beckenham and Penge Urban District Councils.

Thames Conservancy Bill, by the Brentford, Dartford, Gaslight and Coke, and Wandsworth and Putney Gas Companies, the Corporation of London, the London County Council, the Metropolitan Water Board, and Waterside Manufacturers.

Thames Harbour Bill, by the Brentford, Dartford, Gaslight and Coke, and Wandsworth and Putney Gas Companies, the Metropolitan Water Board, and Waterside Manufacturers.

Petitions of a general character have also been presented against the following Bills: Accrington District Gas and Water Board Bill, Andover Lighting and Power Bill, Aylesbury Gas Bill, Bolton Corporation Bill, Bootle Corporation Bill, Brentwood Gas Bill, Brockenhurst Gas Bill, Colne Corporation Bill, Great Berkhampstead Gas Bill, Halifax Corporation Bill, Heckmondwike Improvement Bill, Hitchin and District Gas Bill, Morley Corporation Bill, North Sussex Gas Bill, Otley Gas and Improvement Bill, Seaham Gas Bill, Skegness Water Bill, South Oxfordshire Water and Gas Bill, Stockport Corporation Bill, Sunderland and South Shields Water Bill, Swansea Corporation Bill, and Wrexham Gas Bill.

Among the other petitions presented are the following: Against the Aberdare Tramways Bill, by the Aberdare and Aberamen Consumers' Gas Company, and the London Southern Tramways Bill, by the South Metropolitan Gas Company; against the Shropshire and Worcestershire Electric Power Bill, by the Cannock, Hednesford, and District Gas Company, the Lichfield Gas Company, and the Tamworth Gas Company; against the South Wales Electrical Power Distribution Company Bill, by the Llanelly Gas Company and the Llanelly Urban District Council; against the Metropolitan Pneumatic Despatch Bill, by the Gaslight and Coke Company; against the Croydon Corporation Bill, by the Croydon Gas Company; and against the Rathmines and Rathgar Extension and Improvement Bill, by the Alliance and Dublin Consumers' Gas Company.

Reductions in Price.—At the annual meeting of the Yeadon and Guiseley Gas Company, it was announced that the price of gas would be reduced, as from Jan. 1, from 2s. 9d. to 2s. 8d. per 1000 cubic feet. The Directors of the Matlock Gas Company notify that as from April 1 there will be a reduction of 2d. per 1000 cubic feet in the charge for gas, making the price 3s. 2d.

The Hessle Gas Company's Bill.—At the last meeting of the Sculcoates Rural District Council, the Council's petition against the application of the Hessle Gas Company for statutory powers was signed and sealed by the Chairman (Mr. J. H. Fisher, J.P.). In consequence of the defeat of their own scheme by the ratepayers, the Hessle Urban District Council have decided not to oppose the Company's Bill.

The Quality of the South Suburban Company's Gas.—At the meeting of the Lewisham Borough Council last Wednesday, the General Purposes Committee reported having received communications as to tests made on the 5th and 6th of January, by the Gas Examiner, of gas supplied by the South Suburban Gas Company. On the 5th, the sulphur was stated to be 28·95 grains, and on the 6th 30·12 grains, per 100 cubic feet; but the Committee did not advise the taking of proceedings in these cases. The report was adopted.

Self-Charging Vertical Gas-Retorts, Limited.—A Company under the above title has been registered, with a capital of £20,000, in 2s. shares, 90,000 of which are deferred, to adopt an agreement with H. Maconochie and Sir Augustus C. F. FitzGeorge, C.B., K.C.V.O., with a view to the acquisition of the rights and interests in the Settle-Padfield patent, to turn to account the inventions connected therewith, and to carry on the business of gas-retort manufacturers, ironfounders, engineers, &c. There will be no initial public issue.

Harrow and Stanmore Gas Company.—The report of the Directors of this Company for the half year ended the 31st of December states that the balance on the profit and loss account is £6339. The Directors recommend that dividends be declared for the six months at the rate of £9 15s. per cent. per annum on the original "A" capital, of £7 per cent. per annum on the additional "B" capital, and of £6 16s. 6d. per cent. per annum on the additional "C" capital and guaranteed shares. This will leave £2620 to be carried forward.

Oil Lighting Superseded by Gas at Whitton.—Owing to the increasing importance of Whitton as a suburb of Ipswich, instructions were recently given by the Paving and Lighting Committee to the Ipswich Gas Company, who have extended their mains through the village, to fit up sixteen street lamps to be lighted on the incandescent system. They were put into use for the first time last Saturday week, and presented a brilliant appearance as compared with the oil-lamps they have superseded; while the cost per lamp is, it is said, cheaper than oil. It may be mentioned that the lamps have been fitted with the lighting and extinguishing device supplied by the Automatic Light Controlling Company.

LEGAL INTELLIGENCE.

GREENWICH POLICE COURT.—Wednesday, Feb. 15.

(*Before Mr.* RUPERT KETTLE.)

A Retort-House Chimney and an Alleged Smoke Nuisance.

In this case, the South Suburban Gas Company were summoned, at the instance of the Lewisham Borough Council, for causing a nuisance through dense black smoke issuing from one of their retort-house chimneys.

Mr. TEMPLER L. DOWN, Solicitor to the Borough Council, appeared in support of the summons; Mr. HORACE AVORY, K.C., and Mr. T. T. BLYTH (instructed by Mr. C. F. T. Blyth, of Messrs. Blyth, Dutton, Hartley, and Blyth) represented the Company.

Mr. DOWN said this case referred to a nuisance caused by dense black smoke issuing from one of the defendants' chimneys; and the proceedings were taken under section 24 of the London Public Health Act, 1891. In order to remind his Worship of the procedure, he quoted sub-section B of this section and section 3. The sanitary inspector observed the nuisance on Nov. 8 last, when dense black smoke issued from the chimney for fifteen minutes; and this was reported to the Sanitary Authority on Nov. 10. Coming to section 4 of the Act, on receipt of any information respecting the existence of a nuisance, the Sanitary Authority, having been satisfied of the existence of a nuisance, had to first serve notice on the persons responsible to abate it. Then section 5 provided that, if the person on whom the notice to abate the nuisance was served made default in complying within the time specified, the Sanitary Authority were to make application to the Court to issue a summary order either to abate, prohibit, or for closing the premises. He (Mr. Down) asked for an order. The information was laid on Nov. 10. The matter came before the Borough Council; and, being satisfied of the existence of the nuisance, they ordered the statutory notice to be served. Further observation was kept on the chimney; and further smoke was observed to issue on Dec. 20. The statutory notice was served by letter dated Dec. 23. Again observation was made; and on Jan. 4, smoke causing a nuisance was noticed coming from the chimney between 2.31 p.m. and 2.37 p.m.—a period of six minutes. On the same day, smoke issued from 2.49 p.m. to 2.59 p.m.—a period of ten minutes; and on Jan. 5 from 3 5 p.m. to 3.30 p.m.—a period of 25 minutes. He should like to refer to the case of the *South London Electric Supply Corporation v. Perrin*.

Mr. AVORY pointed out that the only notice served was dated Dec. 22.

Mr. DOWN admitted that the only statutory notice served was on Dec. 22. In the case he was referring to, black smoke issued from a chimney several times a day during several days, for varying periods of a few minutes to upwards of an hour; and it was there decided that the magistrate was justified in finding that such smoke was sufficient to cause a nuisance. He cited this case because there were a large number of complaints issued, not only for different days, but for different hours; and in four at least of these separate complaints there were separate proceedings. It was a question of fact for his Worship, as to whether this smoke issued in such quantity as to cause a nuisance; and he submitted that, when they had large volumes of dense black smoke issuing from a chimney as in this case, his Worship was justified in finding it was a nuisance within the Act.

Mr. *B. A. Knappett*, one of the Sanitary Inspectors of the Lewisham Borough Council, stated that on Nov. 8 he was at Lower Sydenham in the vicinity of the gas-works.

Mr. AVORY asked whether they were to have evidence referring to Nov. 8. Looking at the summons, it was for making default on Jan. 5, in complying with the requisitions of the notice of Dec. 22. The notice of Dec. 22 was served upon the Company in a letter dated Dec. 23, which stated that notice was sent therewith in respect of a smoke nuisance at the works on Dec. 20. Opportunity was also taken in that letter of informing the Company that the nuisance complained of was from 2.55 p.m. to 2.56 p.m. and from 3.5 p.m. to 3.8 p.m. Therefore, said learned Counsel, the only nuisance complained of was on Dec. 20, with a total of four minutes, and an interval between. The offence the Company were summoned for was for making default in not complying with the notice of Dec. 22. He was not prepared to meet anything referring to Nov. 10. His Worship was asked to issue an order under section 5; and he could only do that if the Company had made default in complying with the requisitions of a notice.

Mr. KETTLE observed that all the summons dealt with was the issue of the smoke between 2.55 p.m. and 2.56 p.m., and from 3.5 p.m. to 3.8 p.m. on Dec. 20.

Mr. DOWN described what had passed in connection with the matter between the reporting of the nuisance on Nov. 10 until Jan. 5, to show that it took time to comply with the requirements of the Act before proceedings could be begun, and that the proceedings had reference to a "long-standing" nuisance.

Mr. AVORY pointed out that, until the Company came into Court, they did not know anything of the chimney having smoked on some of the days mentioned.

Mr. KETTLE remarked that the default was on the 5th of January; and this was in respect of a notice dated Dec. 22.

Mr. DOWN said if it was shown that, on Dec. 20, there was a smoke nuisance, and if it was further shown that, after the notice, this nuisance still existed on Jan. 5 (when they could prove that black smoke issued for 25 minutes), then he said these proceedings were in order; and he further submitted that he could go into evidence of nuisance prior to the date of the statutory notice.

Mr. AVORY formally objected.

Mr. KETTLE did not see how Mr. Down could go into anything before Dec. 20.

Mr. DOWN: Then you disregard altogether the statutory information on Nov. 10.

Mr. AVORY: The only charge against us is in making default.

Mr. DOWN, after further discussion, said it seemed that he must accept the ruling of his Worship shutting out the evidence of nuisance on Nov. 8.

Witness then gave evidence as to sending, by registered letter, the statutory notice, on Dec. 23. On Jan. 5, he saw dense black smoke issuing from the shaft of the retort-house from 3.5 p.m. to 3.30 p.m. The emission was without interruption, and from the full bore of the chimney.

Cross-examined: The height of the chimney was about 70 feet. He did not give notice to the Company, or to any of their officials, on Jan. 5. Asked whether he knew anything of the process of gas making, witness said not of "burning part." Asked whether he suggested this black smoke came from the furnaces which heated the retorts, his reply was that it came from the fires heating the retorts.

In re-examination, the question was put to witness whether he had any personal knowledge as to where this smoke came from, and he answered only from the chimney.

Mr. *John Daltry*, another Sanitary Inspector to the Borough Council, gave evidence to the effect that he saw black smoke issuing from the chimney on Dec. 20. It was coming out full bore between 2.55 p.m. and 2.56 p.m. and 3.5 p.m. and 3.8 p.m.

Cross-examined: It was dense black smoke; and just before and after the times named it was grey. He was watching altogether for about an hour, beginning about 2.30.

Mr. DOWN sought to be allowed to amend the summons so as to include the evidence of what took place prior to Dec. 20.

Mr. KETTLE pointed out that, in the letter sent to the Company, it was distinctly stated that the statutory notice referred to Dec 20. There was no statutory notice for November.

Mr. *Harry Wilkins* gave evidence as to the ordering of the statutory notice by the Council on Nov. 30.

Mr. AVORY submitted that the proceedings were misconceived altogether. This allegation of a nuisance by black smoke was peculiar, and required to be carefully dealt with under these sections, because this was not like an ordinary case of nuisance which was a continued nuisance, and might be abated. Each issue of black smoke from the chimney was a separate matter; and it was provided that it must be sufficient to constitute a nuisance. The first question they had to determine here was whether, on Dec. 20, there was, in fact, sufficient black smoke to constitute a nuisance under section 24 of the Act, because the words of it were: Any chimney, not being a chimney of a private dwelling-house, sending forth black smoke in such quantity as to be a nuisance. The first nuisance was from 2.55 p.m. to 2.56 p.m. Ever since he had had anything to do with these matters, he had understood it was an accepted rule in the Metropolis that no Magistrate ever convicted on a nuisance where the allegation was that the black smoke continued for the space of a minute only; it was not deemed sufficient to constitute a nuisance where the black smoke continued for a minute only. The other allegation was of three minutes, after an interval, on the same day; and his Worship had the evidence of a witness that he had watched the chimney for an hour. Therefore the only thing complained of was this issue of black smoke for one minute and three minutes; and as it was admitted that the chimney did not go on sending out black smoke, it must be assumed, for the purposes of this case, that, on Dec. 20, there was no other black smoke coming from the chimney, except on those two occasions. He said, in point of fact, that was not sufficient to constitute a nuisance within the meaning of the Act; and it was of more importance to consider whether it could be properly dealt with as a nuisance when they had regard to the other sub-section of the same section. Sub-section A was intended to specifically deal with gas-works. It would be noticed that Sub-section A provided that any fireplace or furnace which did not, "as far as practicable," consume its smoke in any mill, factory, gas-works, &c., should rank as a nuisance.

Mr. DOWN: That is not a chimney.

Mr. AVORY replied that he did not say a chimney; he said a furnace. That was a sub-section that was expressly meant to apply to gas-works; and when they came to the proviso of the section, they had this provided, that the Court, hearing a complaint against a person in respect of any nuisance arising from a fireplace or furnace which did not consume smoke arising from the combustible used, should dismiss the complaint, if satisfied that such furnace was constructed in such manner as to consume "as far as practicable," having regard to the nature of the manufacture, all smoke arising therefrom, and that such fireplace or furnace had been properly attended to. He was not saying that, in law, they could not proceed under Sub-section B in case of a chimney of a gas-works. But what he was saying was that Sub-section A was the one intended to apply to the furnaces of gas-works; and if this section was applied, then the defendants got the benefit of the proviso, and they were entitled to have the complaint dismissed if they showed that their furnaces were constructed to, as far as practicable, consume the smoke. The Council shut them out from their statutory defence, which was intended to be available for every case where complaint was made about the furnace of a gas-works. He asked one witness where he suggested the smoke came from; and his answer was that it came from the furnace of the retort-house. Therefore, by taking action under Section B, the Council shut the Company out from their defence. When they did this, it became very important to the Company as to the black smoke being of such a quantity as not to be a nuisance. Turning back to sections 3 and 4, What was the complaint against the Company? It was that they made default in complying with the notice of Dec. 22. The notice of Dec. 22 was to abate the nuisance of Dec. 20, which consisted of black smoke coming from the chimney for one and three minutes. Where was there any evidence that they did not abate that nuisance? It must be assumed that they did abate it, because there was no evidence that on Dec. 21, 22, 23, 24, and so on, there was any nuisance.

Mr. DOWN: I tendered evidence for Jan. 5.

Mr. AVORY (continuing) said there was no evidence there was any black smoke on the dates named; and therefore the smoke nuisance of Dec. 20 was, in fact, abated. Anything that happened on Jan. 5 was possibly a fresh nuisance; but anything that happened on that day was not a failure to comply with the notice of Dec. 22, because in the interval between Dec. 20 and Jan. 5 the nuisance had been abated. This was why, in his experience, summonses for smoke nuisance had always been taken under sub-section 4, which was the one applicable, and which (after providing that statutory notice should be given) provided that, where the nuisance arose from the wilful act or default of the person concerned, he was to be liable to a fine. These proceedings about abating were not applicable to smoke nuisance of this kind which only occurred at intervals, because, if the nuisance were abateable, then they could not summon a man or convict a man for failing to abate. The evidence here was that smoke was seen again on Jan. 5; and this showed that it had been abated in the interval. He should take this as his legal standpoint; and, of course, if his Worship was with him on the point, it would not be necessary for him to go into the evidence. If necessary, he would prove what happened in these cases—that it was an entire mistake to suppose this was black smoke coming from the furnace at all.

Mr. DOWN: We say from the chimney.

Mr. KETTLE: I do not find any evidence that black smoke came from the chimney in such quantity as to be a nuisance.

Mr. AVORY: You find it was a fact that it was not sufficient to cause a nuisance?

Mr. KETTLE: The evidence upon this summons shows that it was not of sufficient importance to be a nuisance.

Mr. DOWN: Then I will ask your Worship to state a case with regard to the exclusion of evidence prior to the service of the statutory notice.

Mr. KETTLE: It appears to me that evidence is entirely outside this summons. How am I to state a case?

Mr. AVORY: You cannot state a case on a question of law that does not arise on the summons.

Mr. DOWN said he would consult his clients on the matter.

On the application of Mr. AVORY, his Worship thought the Company were entitled to 5 guineas costs.

SPURIOUS MANTLE PROSECUTIONS.

At the Birmingham Quarter Sessions, on the 9th inst., Thomas Atkinson surrendered to his bail on an indictment for unlawfully selling, in February last year, to Charles Facer, one gross of incandescent "Sunlight" mantles to which a false trade description was applied. Accused had elected at the Police Court to be tried by a Jury. Mr. Parfitt, who prosecuted, explained that the charge came under the Merchandise Marks Act, 1887; and the false trade description consisted in the fact that the mantles were not made by, and did not belong to, the New Sunlight Incandescent Company. There were in Blackburn four people, as well as the prisoner—men named Thomas Bradley, Walter Bradley, Alfred Walton, and William Walton—who had been dealing in spurious articles for some long while. From a conversation which prisoner had with Mr. Goodyear, an inspector in the employ of the Company, there could be no doubt that at some time or other these people fell out. At the end of 1902 or the beginning of 1903, it appeared that large orders for these spurious "Sunlight" mantles were placed with a man named Lodin, in Amsterdam. Thomas Bradley and Alfred Walton went to Amsterdam for the purpose of seeing that the orders were carried out. A large quantity of the mantles were despatched to this country through a shipping agent. The Sunlight Company, in March, 1903, managed to get evidence against Thomas Bradley, with the result that he was prosecuted in Birmingham and fined £20 and costs; while a large number of the spurious mantles were confiscated. After the conviction of Thomas Bradley, the present prisoner and Alfred Walton went to Amsterdam, and began to trade in the name of Jansen and Co.; and they placed an order as agents with Lodin for 250 gross of mantles, to be stamped "Sunlight." For some reason or another the Bradleys, after the conviction and prosecution of one of them, got rather shy of dealing in these spurious mantles; and on May 13 William Walton, who remained in England, wrote a letter to Alfred Walton and the prisoner in Amsterdam. Whatever prompted the writing of this letter from Blackburn, there was no doubt that the prisoner either felt things were becoming too hot, or that he could make some money by turning informer, as on May 21 he wrote to the Company stating that he could give information as to a lot of infringing mantles. Mr. Goodyear went to Amsterdam and saw the prisoner, who offered, on being paid a certain sum, to come over to England and prove that Thomas Bradley was at the bottom of the business. The conditions were accepted; but after a while Mr. Goodyear saw that prisoner was rendering him no help, and yet was constantly asking for money. Later on it was discovered that prisoner was selling spurious articles on his own account. The "Sunlight" boxes in which some of the goods were sent were replaced by boxes bearing the word "Stella." Prisoner called on Mr. Facer with a case marked "Stella." Mr. Facer asked prisoner what price he wanted per gross, and prisoner replied "14s." Prisoner went away, and returned with a gross box marked "Stella." Instead of being "Stella," however, Mr. Facer found the mantles were stamped "Sunlight. In August, from information given, Mr. Goodyear called on Mr. Facer, and found that prisoner was selling the spurious mantles. Mr. Facer was summoned; but on explanation, the case was withdrawn on payment of costs. Prisoner, said Counsel, had played fast and loose with Mr. Goodyear. Altogether he received £160 in cash and goods; and this money was easily earned. Evidence having been given, Mr. Dorsett submitted for the defence that there was no case to go to the Jury. It was clear the prosecution did not allege that prisoner forged any trade mark. "Sunlight" was not a trade description; if anything, it was a trade mark. The Recorder (Mr. J. S. Dugdale, K.C.): How do you distinguish between the two? Counsel said that "Welsbach" was a trade mark, and could be protected as such. "Sunlight" was not an invented name, and could not be protected. It did not describe an article, but was only a name inscribed on the article to identify it. The prosecution did not allege it was a trade mark. Anyone was entitled to use the word "Sunlight." Mr. Parfitt thought the point was clearly

covered in the Act. On the evidence of Mr. Goodyear, it was clear that "Sunlight" mantles were produced in a particular way. The Recorder said he would overrule the objection, but would grant a case if necessary. Accused admitted selling mantles to Mr. Facer in February last year. He denied that the word "Sunlight" was on the mantles; they were plain. He had purchased them from the Blackburn Incandescent Company. Mr. Parfitt: That is Bradley. The Recorder first asked the Jury if they were satisfied that the mantles sold were proved to bear the word "Sunlight." There were two witnesses—Mr. Facer's son and a tailor—whom he thought might have been called. The Jury said they were of opinion that the prosecution had not proved their case, through insufficient evidence. Accused was thereupon discharged. On the question of costs being raised by Mr. Dorsett, the Recorder said he would give none unless he were obliged to.

John Donoghue, trading as the Corporation Mantle Company in Regent Road, Salford, was summoned before the Salford Stipendiary last Wednesday, for infringing the Merchandise Marks Act. There were two cases against him of selling under a false trade description. The first had reference to the sale of "The British Gas-Mantle," said to have been made in Germany, and the second to what was known as the "Hureka" mantle. A fine of 20s. and costs was imposed on the first summons, and a nominal penalty of 1s. and the cost of the summons on the second.

Question of Negligence in Regard to a Lucas Lamp.

In the Court of Appeal, on Thursday and Friday last, Lords Justices Vaughan Williams, Romer, and Stirling had before them the case of *Glover v. Higgs*. It was an appeal from a decision of the Lord Chief Justice and Justices Kennedy and Ridley, in November last, ordering a new trial of the action, but refusing to enter judgment for the the defendants, as they asked the Court to do. [See "JOURNAL," Vol. LXXXVIII., p. 415.] The action was originally tried in the Lambeth County Court, with a Jury; being brought by a workman in the employment of the defendants, Messrs. Higgs and Co., building contractors, under the Employers' Liability Act, to recover damages for injuries sustained by the falling upon him of a large Lucas lamp, which the defendants had hired from the Wandsworth and Putney Gas Company for use at some premises at Battersea, where they were doing work under contract with the London County Council. The defendants disclaimed any liability, on the ground that the Gas Company not only supplied the lamp, but kept it in order. The learned County Court Judge, however, left certain questions to the Jury, on which they found a verdict for the plaintiff for £75. The Divisional Court thought there had not been a satisfactory direction to the Jury, and on this ground ordered a new trial, but did not see their way to say that there was no evidence of negligence to go to the Jury, and therefore would not enter judgment for the defendants, but gave leave to appeal. The defendants therefore presented the present appeal, which was argued for them at considerable length by Mr. Pickford, K.C., and by Mr. Abel Thomas, K.C., and Mr. Craig Henderson for the respondent, who, besides endeavouring to show that there was some evidence of negligence on the part of the defendants or their servants, asked the Court, if they came to the conclusion that there was none, to remit the case to the County Court Judge, so as to allow of a claim being made under the Workmen's Compensation Act. After hearing the arguments, their Lordships came unanimously to the conclusion that the appeal ought to succeed. They held that there was no evidence of negligence on the part of the defendants, and that they were entitled to have judgment entered in their favour in the present action. They, however, acceded to the request to remit the matter to the County Court Judge, to deal with the question under the Workmen's Compensation Act; and, with defendants' consent, the whole of the costs would be left to his Honour.

The Omagh Gas-Works Purchase Award.

In the King's Bench Division, Dublin, last Tuesday, in the case of the *King* (*Michael Lynch*) *v. Joshua W. Edmondson*, Mr. Henry, K.C., applied on behalf of Mr. Lynch, the Chairman, and the Omagh Urban Council for an order of certiorari to bring up, for the purpose of same being quashed, the award of Mr. J. W. Edmondson in the Omagh gas-works purchase arbitration. The affidavit of Mr. Lynch stated that the Council negotiated for the purchase of the works; and in 1901 an Act was passed, under the 70th section of which, if the parties failed to agree as to the price, the matter was referred to the arbitration of Mr. Edmondson, by the nomination of the Commissioners of Public Works. Evidence was given before him that the undertaking was making for the Company £1000 a year; and his award fixed the price to be paid at £26,880. Counsel said that it was clear from the award that the Arbitrator made it in violation of the 70th section of the Act referred to, and assessed the sum to be paid by the Council having regard to the fact that the Company was incorporated; and he submitted that the award was bad on its face, and made without, and in excess of, jurisdiction. The Court made a conditional order.

Mr. Douglas F. Colson and his Motor-Car.

At the Leicestershire Assizes, last Friday, before Mr. Justice Phillimore and a Special Jury, an action was heard in which Mr. Abraham Hinckley, a builder and contractor, of Leicester, sought to recover £250 damages from Mr. Douglas F. Colson, the Manager of the Weymouth Gas-Works, for personal injuries. Plaintiff's case was that, when riding a bicycle on April 30 last year, he met the defendant coming along in a motor-car on the wrong side of the road. Passing a side street, the motor, which was going about ten or twelve miles an hour, suddenly swerved towards the kerb, and colliding with plaintiff's bicycle caused him to be thrown. No warning was given by the defendant that he was going to turn; and plaintiff fully believed that he was going straight on. Three of plaintiff's ribs were broken, one in two places, and there was, said the doctor, evidence of a slight lung puncture. Mr. Colson, in his evidence, stated that at the time of the accident he was travelling at four or five miles an hour. He saw plaintiff coming up the road, and, after passing between a truck and the kerb-stone, make a deviation to the right as if he was going to pass the car in the rear and turn into a side street. The car struck the plaintiff's bicycle between the wheels; plaintiff being thrown against the car's mudguards. The plaintiff was somewhat severely questioned by the Judge regarding a letter which he sent to the Chief Constable exonerating the defendant from blame. This letter plaintiff said he wrote at the suggestion of the defendant; but Mr. Colson stated that plaintiff proposed the sending of the letter, and he forbade him to do so. The Jury returned a verdict for the plaintiff, assessing the damages at £100.

Appeal against a Compensation Award.

Judge Cadman, sitting at the Halifax County Court on Friday, had before him an appeal arising out of an accident by which two men lost their lives while engaged at the Ardsley Gas-Works. In March last, the men referred to were employed by Messrs. Woodhouse and Mitchell, of Brighouse, on an engineering job at the works. Operations were kept on day and night; but the two men were admittedly able to leave work for short periods for rest and refreshments. One evening, after placing a labourer in charge, they retired to an adjacent cabin; and while sleeping there were suffocated by carbon monoxide gas. The relatives brought an action against Messrs. Woodhouse and Mitchell, before Mr. Vincent Thompson, sitting as Arbitrator, for compensation, which was awarded. Against this decision the respondents now appealed. The two questions submitted for consideration were: (1) Whether the death of the two men was caused by an accident within the meaning of the Act; and (2) whether, if so, it arose out of, and in the course of, their employment. His Honour, in answering them in the affirmative, remarked that continuous work was being carried on under the charge of the two men. Though they were taking the short rest allowed, they had a person on the watch, so that, if their attention was required, they might be at once called. He considered that they were as much on duty as soldiers in a guard room were on duty while the sentry was on the watch outside. For the respondents it was intimated that there would probably be an appeal to the Divisional Court.

Compensation for a Gas Explosion.

At the Reading County Court, on the 9th inst., before his Honour Judge the Hon. Arthur Russell and a Jury, Mr. Neville Walsh brought an action against the Reading Gas Company to recover £100 as compensation for personal injuries sustained, and for damage to property and furniture and loss of business caused, by an explosion of gas on his premises, on Dec. 3, owing, it was alleged, to the Company's negligence. Mr. Ricards said that plaintiff, who carried on business as a dentist in Blagrave Street, Reading, had for some time noticed a smell of gas, especially in his waiting-room. He called in two gas-fitters, who tested his pipes and fittings, but could not find any defect. They then came to the conclusion that there must be an escape from the main, and that the gas entered the house near the meter. Plaintiff then telephoned to the Gas Company, who sent a man round. He failed to find any escape, but admitted that he could detect a faint smell of gas on the first floor. Other people having offices near also complained at times of the smell; and eventually the Company took up the roadway and examined the pipes, which they said were not defective. It was arranged that the gas should be turned off at the meter at night, in order to test where the smell came from. On the night of Dec. 3, plaintiff went into the cellar with a lighted taper to turn off the meter, when an explosion immediately occurred. He was knocked backwards, and for some little time was rendered insensible. When he recovered, he found that his coat-sleeve had caught fire and that his left hand was seriously burnt. He telephoned to the Company, who despatched two men; and he also sent for the Fire Brigade, as he could smell fire. Mr. Pontin, the Chief Officer, at once came, and expressed the opinion that there was a fracture in the main, caused probably by the steam-roller which had been used in repairing the roadway some time previously. Plaintiff, Counsel contended, had a right of action against the Company for having allowed an escape of gas. He offered to accept £50 in settlement; but they would not entertain the proposal. Plaintiff, in his evidence, stated that he was under the doctor for a fortnight, and his furniture was damaged to the extent of £17. He increased his claim from £50 to £100 because, since making his offer, he had been put to further expense. Mr. Cranstoun, for defendants, urged contributory negligence on the part of the plaintiff by going with a light to find the escape. After hearing the Engineer (Mr. Douglas Helps) and other witnesses, the Jury found for the plaintiff, and assessed the damages at £25. Judgment was given accordingly, with a stay of execution for three weeks.

The Supply of Water for Trade Purposes.

At the Mistley Petty Sessions yesterday week, a baker named Nunn, of Wix, was summoned for taking water supplied by the Tendring Hundred Water Company, he not being one of their paying customers. Mr. E. Thompson Smith, who prosecuted, explained that last July, it having come to the knowledge of the Company that defendant was using water for other than domestic purposes, the Secretary informed him that the charge would be increased to £1 per quarter, to include the water supplied for the bakery. As he did not pay, the water was cut off in October, and defendant was watched. It was then found that he was using water obtained from a cottage occupied by another man. The defendant, addressing the Bench, said his water-rate had been raised from 5s. to £1 per quarter, though he had an agreement that

the charge would be the former amount only. He was standing out against extortion. The Chairman asked if the Company's charge was statutory, to which Mr. Thompson Smith replied that it was outside the statute. If a man thought the water-rate unreasonable, he need not take the water. The Company were not compelled to supply water for trade purposes. The Clerk: Then how is a trader to get water? The Secretary (Mr. Jackson) said that he could do so by arrangement with the Company. The Clerk: But supposing, for the sake of argument, that the Company charged an unreasonable amount? Mr. Thompson Smith said he believed that the Company had offered to supply the defendant by meter. The Chairman remarked that a man's trade might be absolutely destroyed if he could not get water. Mr. Thompson Smith: That is so; but in any business, if a trader cannot buy his goods at remunerative prices, he must stop his trading. Defendant was fined 30s., with 12s. costs.

Connecting a Pipe to a Water-Main without Consent.

Mr. James H. Fenton, a millowner, was summoned a few days ago by the Rochdale Corporation for wrongfully taking and using water from a pipe belonging to them, and also with causing or permitting a hose-pipe to be affixed to a water-main without their consent. The Town Clerk (Mr. W. H. Hickson) said that for ordinary purposes the defendant took water from the Corporation by means of a meter; but in addition to this, it had been his custom for several years to have a supply from the street mains for the purpose of refilling the boilers at his mill after they had been cleaned. This special supply had been taken about seven times in each of the years from 1900 to 1903. He took a similar supply in February, April, and May, 1904; but then it stopped. Subsequently the Water Manager (Mr. Tomlinson) noticed that the defendant had not required a supply of water for a considerable period, and inquiries were instituted. As a result, observations were taken; and on a Sunday a Corporation employee saw a hose-pipe attached to a main, and apparently a supply of water being taken from it. He went to the mill, and noticed that water was being taken through the hose-pipe into the boiler. A question was addressed to the engineer-in-charge; and from the reply it would seem that he was not altogether ignorant of the requirements of the Corporation. The Manager thereupon wrote to the defendant informing him that the matter would be notified to the Committee. In reply, a letter was received stating that Mr. Fenton found a post-card had been despatched asking the Corporation to send a man to fill the boiler as usual. His engineer, being a new man, waited until Sunday, and then, as no one appeared in accordance with the request, and not knowing the Corporation rules, he took barely enough water to get the fire going. After investigating the case, the Manager wrote that he could find no notice for the filling of the boiler on the date mentioned. Mr. Hickson pointed out that the penalty for the first offence was £10, and for the second £5. The defendant, who admitted the facts, said that in 1904 he did not need the water from the Corporation more than three times, for the reason that at the mill there was an apparatus which entirely did away with the necessity for cleaning out the boiler every six weeks as formerly. On the occasion referred to in the summons, his clerk said he sent the notice to the Corporation in the usual way. When no Corporation employees put in an appearance, his engineer, who was a new man, and did not know the requirements, fetched him (the defendant). He then told the man to take the water from the main and report the matter to the Corporation. The Borough Magistrates imposed a fine of £5 and costs in the first case. The second summons was withdrawn on the payment of costs.

Wrongful Use of Water by Builders.

At the Highgate Police Court last Wednesday, Messrs. Jordan and Paine, builders, of Stoke Newington Road, were summoned by the Metropolitan Water Board for wrongfully using water. Mr. A. B. Shaw, who appeared for the Board, stated that a dispute had arisen between them and the defendants as to the price to be paid for the water they required for their building work at Fortiss Green; and the result was that they had a tank in a field, and supplied from a tap in a neighbouring unoccupied house. Arthur Collins, a turncock, said the tank on the works had a capacity of about 80 gallons, and it was filled, by means of a pipe 30 feet long, from the domestic service of the house No. 14, Lynmouth Road. He first saw the connection on the 22nd of December, and had observed the water running every time he went to the place up to the preceding day. In cross-examination, witness said the work had been done by Messrs. Myring Bros., and was taken over by the defendants. George William Bulley, a foreman in the New River District of the Board, gave corroborative evidence as to the tank. George Benjamin Bulley, a collector, stated that the water-rate was not paid for No. 14, Lynmouth Road, and had never been paid, because the house had not been let. He had to take proceedings against Messrs. Myring Bros., and the water in some cases was cut off. Various builders had had the work in hand, and 10s. each had been paid for 18 houses, in advance. Mr. C. V. Young (for the defendants) submitted that the proceedings had been taken under the wrong section (20) of the Water-Works Clauses Act, 1863, as this applied to persons who had had their water cut off, and then went to an empty house to obtain a supply. Here the water was not taken from a pipe within the empty house, but from a tank some yards from it. As to the plea that the water was taken from the tank, the summons was for "taking or using water;" and it was obvious that water from the house was used. The Chairman (Sir Francis Cory-Wright) decided against the defendants, and suggested that an agreement should be arrived at as to the amount to be paid. Mr. Shaw said the proper price for each of the nine houses would be 25s.; and the Board offered to take half. The Chairman thought 12s. 6d. too much, and proposed 8s., and 3s. 6d. for the connection. This was agreed to. As the parties had come to terms, the defendants were only fined 20s., with 21s. costs. The Chairman said there was nothing dishonest about the defendants' action, which was the result of a squabble, but they did wrong to take the water.

MISCELLANEOUS NEWS.

COMMERCIAL GAS COMPANY.

The Ordinary Meeting of this Company was held last Thursday, at Cannon Street Hotel, E.C.—Mr. W. G. BRADSHAW in the chair.

The SECRETARY (Mr. H. D. Ellis) read the notice convening the meeting; and the Directors report and the accounts, which were dealt with in the "JOURNAL" last week, were taken as read. In affixing the seal to the Register of Proprietors, the Chairman mentioned that the Company had now 2236 stockholders. The number had considerably increased during the half year.

DEPRESSED TRADE AND THE PRICE OF GAS.

The CHAIRMAN: Gentlemen, it becomes my duty and pleasure to move—"That the report and accounts be received, adopted, and entered on the minutes." I think that, under all the circumstances of the case, you will agree that the report and accounts for the half year are satisfactory. You will remember that, when we had the pleasure of meeting you in August, I explained the reasons which had led the Directors to reduce the price of gas by 1d. per 1000 cubic feet, though we did not anticipate that we should earn this half year our full statutory dividend; and I think that you fully endorsed our action. I pointed out, if you recollect, that the trade of our district was depressed, and that we considered it was the right policy to do what we could to help our poorer consumers to tide over the period of depression. You know our district is a circumscribed one. We are surrounded by districts occupied by other companies; and our district is fully built over, so that there is no possibility of our business increasing, except by our inducing people who have not hitherto taken gas to become consumers. We can only do this by going into the small business, and nursing the small consumers to the best of our ability. It was this consideration which lead us to adopt the policy of reducing the price. That the trade of our district was depressed, the accounts show very clearly. If the proprietors look at the net revenue account, they will see that the bad debts were £1271; while in the corresponding half of 1903 they only amounted to £989—that is to say, they were £282 more in the past half year. This is not a serious thing in itself; because these bad debts still bear a very small proportion to the aggregate amount of the gas-rental; but it is a fair indication that the trade of our district was depressed. It is our system to transfer to a specially qualified collector (whom we call our arrears collector), any sums which the ordinary collectors, after having made every effort, are unable to get in. He brings his special qualification and experience to bear; and it is only when he has done everything he can, that the Directors then write off an amount as bad. Well, now, I am happy to tell the proprietors that the amount transferred to the arrears collector at the end of last half year is smaller than usual; and this points to the fact that our bad debts at the end of this half year will be only normal, and that the trade of the district is showing some signs of improvement. An analysis of the bad debts for last quarter is interesting, as showing the small class of business we are engaged in. The total amount of bad debts for the quarter was £559. The number of debtors was 540; so that the average debt was only £1 0s. 8½d. The largest bad debt was only £23 15s., and the smallest one was 1d. Of the 540 debtors, 119—a very large proportion—were small tailors who use our gas for the purpose of heating their irons; 146 were private residents; 81 were due to robberies and shortages in connection with coin meters; the remaining 194 were spread over 34 different trades.

RESULTS OF THE HALF YEAR—LOSS ON RESIDUALS.

Now, as I have said, we did not expect the figures to be quite so good this half year as in the corresponding half of 1903; but I must say we did not anticipate that the return from residuals would show such a large falling off. As to the actual difference, I will give the result of the half year in a nutshell. We sold 1462 million cubic feet of gas. The cost of manufacturing and distributing that gas, collecting the revenue, and generally managing the concern, was £188,131, as against £182,113 in the corresponding half year. That is an increase of £6018 in the expenditure. But we have been charging 2s. 5d. per 1000 cubic feet of gas, instead of 2s. 6d.; and this would have meant a loss of £6000 for the half year had we not sold 32 million cubic feet of gas more. The extra sale reduces the loss by three-quarters; so that the actual amount received for gas is £175,876, as against £177,232, which is only £1356 less than in the corresponding half year. Now I come to the residuals, which show a very serious falling off; but this is a matter that is entirely outside the power of the Board. We received from residuals £49,215, against £53,993—that is, a decreased receipt of £4777, due entirely to coke and tar. On coke, we received £3995 less; tar gave us less by £1524. But breeze and sulphate came a little bit to the rescue; and we received £742 more from these two items. So, as I say, the total decreased receipts for residuals were £4777. Miscellaneous receipts were £26 less. On the other hand, the stove and meter rental shows a very satisfactory increase indeed; and it is satisfactory because it reveals where the increase of our business is. We received from these sources £16,339, against £13,335 in the corresponding half year. This is an increase of £3004. Putting these figures together, we get a net profit of £9173 less, that is to say, we received £53,511 in the past half year, as against £62,684 in the corresponding half of 1903. The decrease in profit is equivalent to 1½d. per 1000 cubic feet on the price of the gas.

RATE OPPRESSION.

There is nothing, I think, in the expenditure on revenue account to which I need call your attention, except one item, to which I wish to call your very serious notice. It is that of rates and taxes, which are up again this half year by £158. Rates go up regularly every half year; and it is time that some drastic steps were taken to lessen the burden which the extravagance of the municipalities of this country are placing upon the people. I want you to look at the matter

seriously from three points of view. First of all, as it affects this Company. In 1876 (that is the year after we obtained our most important Act—the Act which is really our Charter), the capital of the Company actually expended was £565,157, and the rates for the year were £4742. In 1904, the capital expended was £1,298,941; and the rates for the year were £18,403. That is to say, in 28 years, the capital expenditure has gone up by 129 per cent., while the rates during the same period have increased by no less than 288 per cent., or more than double the rate at which the capital has increased. Now, look at the question as it affects London. Lord Onslow, at a meeting of the London Municipal Society a few days ago, stated that, in the last ten years, the rates in London had gone up from 5s. 10d. in the pound to 7s. 2d.; the debt had increased from 40 millions to 61 millions; and, in the same ten years, the assessment had advanced by no less than 20 per cent. Look next at the question as it affects the whole country. I was reading the other day the local taxation returns (which have just been issued) up to the end of 1903. In 40 years the annual expenditure of the municipalities has gone up from 36 millions to 144 millions—that is to say, it has quadrupled. The total municipal debt of the country at the end of 1903 was 370 millions; and as it increased that year by 27 millions, it is fair to assume that it increased at the same rate in 1904, and must now amount to at least 400 millions. That is more than half the total national debt of the country, which is now 762 millions. Now, gentlemen, I think this is a very serious state of things; and I want to draw your attention to something which is, to my mind, still more serious. During the last few years, the municipalities, finding themselves no longer able to raise large loans at advantageous rates, have adopted the practice of borrowing sums from small depositors at higher rates than the banks can afford to give, because the municipalities do not keep any portion of their assets liquid, as the banks have to do. This practice must have a most disastrous effect upon the industries of the country. Not only have the manufacturers to pay high rates (which enhance the cost of production, and handicap them in their efforts to compete with foreign-made goods), but the money which formerly came to the banks, and was then loaned out to the industries of the country, is now intercepted by the municipalities, with the result that the manufacturer will find himself loaded with the payment of heavy rates at one end and starved for money at the other. This is handicapping our manufacturers in their efforts to compete with foreign countries, and is a very serious state of things. I say nothing about the gross injustice of permitting the municipalities to compete with the omnibus, railway, and gas companies, who are their largest ratepayers, and who have to make good any deficiency which reckless trading produces, although they have no voice whatever in the election of the rating authorities. A remedy ought to be found for this. And where is that remedy to be found? I believe in this matter, as in many others, the remedy lies with the working men of the country; but, unfortunately, the working men of the country do not feel the burden directly upon them, because, owing to the compound system of paying rates, their rates are included in their rent. Therefore, although their rent must increase with the rates, yet they do not actually pay rates, and they do not therefore observe the increase. When the working man wakes up to the fact that, as the rates grow, so his rent increases, so the cost of the coat upon his back increases, the cost of the food in his mouth increases, the cost of the boots he wears increases, and the cost of the light he uses increases—he who has a voice in the election of the municipal authorities will see to it that this extravagance ceases.

THE NET REVENUE.

Well, gentlemen, I will leave that point now to turn to the net revenue account. We brought forward, as you will see, £24,116 (the largest sum brought forward for the last ten years). Our net profit is £53,511; so that the total sum available for the payment of interest on the debentures and on temporary loans, and for the dividend is £77,627. The interest amounts to £8271; and the dividend—at £5 4s. on the 4 per cent. stock, and of 5 per cent. on the 3½ per cent. stock (which are the rates you received last half year, and which we recommend for this half year)—amounts to £49,883, which will leave the substantial sum of £19,473 to be carried forward to the current half year's accounts. This gives you the position of the Company, and the result of the working in the last half year, in a nutshell.

THE CAPITAL ACCOUNT.

I must now say a few words on the capital account. The first item is £6499 for new steamships. Our fleet is now complete and paid for, and is doing good and economical service, so that it may be expected that you will not find, for some time to come, any charge in respect of steamers. The next item is £6708 for new and additional buildings and plant. This really covers a number of small improvements, the cost of which has been, to a large extent, charged to revenue. The principal items are the completion of the cyanogen plant at Poplar, new barges at Wapping, and the adaptation for machinery of one of the retort-houses at Stepney. The other items on this account are all to do with stoves, coin meters, and new services which are all an additional source of revenue to the Company. During the half year, we fixed 4097 stoves (which is a very satisfactory figure), and 5132 coin meters; and the demand still keeps up. There are now in our district 29,949 stoves, and 36,000 coin meter consumers. Looking to the other side of the capital account, it is overdrawn by £49,455; and we have decided, in order to lessen the amount, and to provide for the requirements of the current half year, to issue an additional £50,000 of 4 per cent. capital stock. This will be offered first of all to the consumers and employees; and if it is not taken up by them, it must then, by the Company's Act of 1902, be offered to the general public, among whom the proprietors will participate. You will recollect that the Act does not allow us to give preference in the matter of the issue of stock to our own stockholders. Our consumers and employees have taken up, during the last year or two, no less than £25,000 of the new issues of capital; and we are glad they should be partners with us in our business, and be interested in more ways than one.

PARLIAMENTARY PROPOSALS.

I come now to the proposed legislation in the present session of Parliament. There are no less than seven Bills which more or less affect the Company's interests. You will remember that, at our last meeting in August I told you that a conference had been arranged between the Chairmen of the Metropolitan Gas Companies—Sir William Makins, Sir George Livesey, and myself—with the view to the Companies promoting a joint Bill on the lines of the report of the Departmental Committee of the Board of Trade. The conference took place; and, I am happy to say, it resulted in our agreeing to promote the Bill which I shall presently have the honour to submit to you for your approval. In its main features, the Bill follows the report and recommendations of the Departmental Committee, except in one particular of great importance to this Company—that is, as to the test for illuminating power. If you recollect I explained to you that the Departmental Committee had recommended that our gas should be tested in such a manner as would rob it of from 1 to 1½ candles illuminating power. But, I suppose, in order to satisfy the Companies they also recommended that gas which showed an illuminating power of 13 candles should be called 13 candles, but should be held to satisfy the Companies' statutory requirement to provide gas of an illuminating power of 14 candles. We cannot for a moment agree to this; and therefore the Companies have framed a clause which provides for a simple and straightforward test actually showing our gas at its real illuminating power. The clause we shall submit to Parliament. Then the London County Council are also promoting a Bill somewhat on the same lines as the Companies—at any rate, in its main features. But it also contains provisions which we cannot accept—for example, the reduction of 1d. in the initial price of our sliding-scale, the imposition of tests for calorific power, and tests for illuminating power with the gas burning through a flat-flame burner, instead of an argand. And, of course, the Council also seek to carry out the Committee's recommendation as to the ordinary test for illuminating power, to which recommendation we so strongly object. I do not know that there is any need to enter into these clauses of the London County Council Bill, because a conference has been arranged for to-morrow [Friday] between the Chairmen of the Companies and the representatives of the London County Council, to see whether we cannot come to an agreement to promote one Bill, which shall go through unopposed. Whether or not this will lead to any definite result, I do not know. All I can say is that we are glad to meet the County Council representatives, if only to endeavour to save the Companies and the ratepayers the expense of a long and serious fight. There are five other Bills which affect the Company's interests. Three of them deal with the Port of London. They all seek powers to impose rates upon merchandize; and, among merchandize, coal coming into the river, to which, of course, we cannot agree. Two other Bills are promoted by the London County Council. One is their General Powers Bill, which seeks authority to wire houses in London at the expense of the ratepayers; so that they may sell electricity for lighting purposes. The other Bill is the London County Council Building Act Amendment Bill, which would place serious restrictions upon our factories and buildings. To all these Bills, in co-operation with the Gaslight and Coke and the South Metropolitan Gas Companies, we are offering the most strenuous opposition where they affect prejudicially our interests.

AN OLD OFFICIAL.

There are only two other matters to which I want to allude very briefly. Within the last few weeks, Mr. Cross, who was our late Manager at the Stepney works, passed away. Mr. Cross only retired last year after a long and faithful period of service, extending over no less than 44 years. In fact, he gave his whole life to the service of the Commercial Gas Company. I wish to place on record our regret that he lived so short a time to enjoy the pension which the Company granted him. I also wish to record our appreciation of his long and faithful service, and our respect for his memory. You will, I am sure, sympathize with us in these sentiments.

THE RETIREMENT OF SIR GEORGE LIVESEY.

Then the other matter is alluded to in the report. It is the retirement from the Board of Sir George Livesey. My first duty when I became Chairman of the Company was to convey to Sir George Livesey, in the name of my colleagues, a unanimous invitation that he should accept a seat on the Board; and it was the happiest and pleasantest duty I have had to perform. During the time Sir George occupied a seat at the Board, our relationship was of the most pleasant and cordial description. We regret now that advancing years—although Sir George is still young, with a perennial youthfulness which comes from a lifetime spent in the service of others—has induced him to lessen the number of his engagements, and to retire from the Board. The result of a very serious operation during last summer, we are all glad to know, has been so entirely successful that at the present time Sir George enjoys the very best possible health that a man of his years can have. We regret he has left the Board. For my own part, I shall ever feel grateful to him for the kindness and consideration which he extended to me—a much younger man. Personally, I shall ever count it an honour that I have sat at the same table with the author of the sliding-scale and of co-partnership among gas men, and with one who has done so much for the gas industry and for gas workers. In Sir George Livesey's place, we have elected Mr. Roland Yorke Bevan, who has been a qualified proprietor for many years. Mr. Bevan is a member of the firm of bankers who are so well and honourably known in the City of London. He gained his business experience in their bank; and I am sure you will be ready to ratify his appointment when it is put to you to-day. Now I will close my remarks with the assurance that your property is in first-rate condition, and that the officers and men have worked this half year with a zeal and enthusiasm which is worthy of all praise. I look forward to meeting you next half year with as good a report as the one I have the honour to place before you to-day.

The DEPUTY-CHAIRMAN (Mr. Walter Hunter), in seconding the motion, said he should like to add that he joined cordially with the

Chairman in the regret felt at the retirement of Sir George Livesey from the Board, and with his appreciation of the service Sir George had rendered to the Company. He (Mr. Hunter) wished also to endorse all the Chairman had said in regard to local rating, which he felt bore most unfairly upon companies such as this. As a practical proposal, he felt it would be a good thing to put into operation a suggestion he had sometimes advocated in talking with members of Parliament—viz., that rent receipts for property should show the amount really paid in rent and the amount paid in rates, so as to bring home to the working classes the fact that they were really interested in seeing that this great expenditure should, at any rate, be economically dealt with.

Mr. ENNIS pointed out, in connection with the question of rating, that there might be some misapprehension in the minds of a few of the proprietors present as to the source of the great imposition upon them all round—not only on gas and other companies, but upon individuals. The Chairman had referred to the assessments of the municipal authorities; but, as a matter of fact, in London they had very little hand in the rating. The true shoulders upon which the odium for the heaviness of the rating should fall were to be found at Spring Gardens; the Borough Councils being for the London County Council merely the collecting authority. He was sorry to say the assessment was likely to be very much larger in the coming year—in fact, in one western borough, no less an increase than 10d. in the pound was foreshadowed in the next rates.

A SHAREHOLDER inquired whether the coal which had been damaged by combustion at the Poplar works was included in the stock in hand at the present time, and whether methods could not be adopted in future to prevent this spontaneous combustion.

The CHAIRMAN replied that they were adopting a special method of dealing with the coal, with the view to the prevention of accidents of the kind. He might say that the coal which caught fire was one of the very best coals—if not the very best coal—which came into their works for making gas. But unfortunately it contained a large amount of sulphur, and was very liable to combustion. The cost of the fire (which was rather heavy) was included in the half-year's accounts.

The motion was unanimously adopted.

Moved by the CHAIRMAN, and seconded by the DEPUTY-CHAIRMAN, dividends were declared at the rate of £5 4s. per cent. per annum on the 4 per cent. stock, and of £5 per cent. on the 3½ per cent. stock, both less income-tax.

Proposed by Mr. FREDERICK GREEN, and seconded by Mr. H. E. JONES, Messrs. W. G. Bradshaw, W. Hunter, and R. Y. Bevan were re-elected to their seats on the Board.

Mr. B. W. ELLIS moved, and Mr. WILSHAW seconded, the re-appointment of Mr. G. W. Ilsley as an Auditor; and it was agreed to.

Consequent upon the elevation of Mr. Bevan to the Board, there was a vacancy in the auditorship; and Messrs. B. W. Ellis and H. W. Gell were the candidates. On the matter coming forward, Mr. ELLIS said that, learning Mr. Gell was seeking election to the vacancy, he begged to retire in his favour, as he did not wish to put the proprietors to the trouble of a contested election. Thereupon, Mr. HARSTON proposed, and Mr. FAIRCLOUGH seconded, the election of Mr. Gell; and this was agreed to—that gentleman making due acknowledgment of the proprietors' confidence. Recognition was also made by the CHAIRMAN of Mr. Ellis's kindness in not pressing a contested election.

An Extraordinary Meeting.

An Extraordinary Meeting was then held to consider the question of authorizing the Directors to unite in the promotion of the Bill "to amend the Acts relating to the Gaslight and Coke, South Metropolitan, and Commercial Companies, with regard to the testing of gas, procedure for forfeitures, and otherwise."

The CHAIRMAN read an epitome of the provisions of the Bill, and then moved the resolution giving the necessary authority to the Directors to proceed.

The DEPUTY-CHAIRMAN seconded the motion.

Mr. ENNIS thought it was highly inexpedient that the Bill should be limited to the County of London. It also seemed to him that some provision should be made to bring the Gaslight and Coke Company in line with the 14-candle gas of the other Companies. (Laughter.)

The CHAIRMAN agreed with Mr. Ennis on the latter point (laughter), but added that it was altogether outside his power. He believed the consumers of the country wanted a cheap gas of low illuminating power; and he was not sure the Company had got down far enough yet. They might all live long enough to see the Commercial Company supplying gas of 12-candle or even lower illuminating power; and perhaps, when this happened, the Gaslight and Coke Company would come down to 14 candles. As to the first point, the Board had fully considered it; and he hoped this would be a sufficient reply.

The motion was carried unanimously.

A vote of thanks was passed to the Chairman and Directors.

The CHAIRMAN responded; and then bore his usual testimony to the efficiency, zeal, and enthusiasm of the chief officers, their staffs, and the workmen. The profit-sharing scheme was, in every sense of the word, satisfactory. Their employees now had an interest in the Company of over £14,000; and he hoped the day would come when this would be multiplied by ten. Anyway, this was a good beginning. He moved a vote of thanks to their officers and the men.

The DEPUTY-CHAIRMAN seconded; and it was very heartily passed.

Mr. ELLIS, on behalf of himself and staff, returned his warmest thanks for the vote, and at the same time acknowledging how much he was indebted to those who worked under him. In further remarks, he reminded the proprietors that, on the last occasion, he drew their attention to a most important legal case; and told them it was then in the House of Lords under appeal. That was six months ago. It was then in the House of Lords; and it was in the House of Lords still. The arguments of Counsel had been heard, and judgment deferred.

Mr. S. H. JONES (the Chief Engineer), having also replied, said the increase in the sale of gas of 2¾ per cent. during the six months was peculiarly satisfactory, because at the present time the district was fast converting its lighting from old flat-flame burners to incandescent ones; and when he told the proprietors that this conversion meant a reduction of between 20 and 30 per cent. in the consumption of gas, they would realize that the 2¾ per cent. increase was a great deal better than it looked. The increase of the stove business was also very interesting. The Chairman had touched upon the gratifying increase in the income from this source; and when he (Mr. Jones) told the proprietors that in the last five years the stoves had increased by 140 per cent. on the number of the consumers, it would bear out exactly what the Chairman had said. It was a satisfactory position, because it meant an increased day consumption of gas; and it saved the Company going into the cost of extending gasholder room, which they would have to do to store the gas if it were all used for evening comsumption. Therefore, it would be seen that this class of business represented a saving of capital cost. The day consumption in the past five years had increased by 33⅓ per cent. This was very satisfactory when the night consumption was remaining stationary.

This concluded the proceedings.

WANDSWORTH AND PUTNEY GAS COMPANY.

The Half-Yearly Meeting of this Company was held last Tuesday, at the works—the CHAIRMAN, Mr. H. E. Jones, presiding.

The usual formal business having concluded,

The CHAIRMAN, after proposing that the report and statement of accounts be confirmed and adopted, said the accounts showed that, in spite of the reduction in the price of gas of 2d. per 1000 cubic feet, the Company had managed to earn the extra dividend under the sliding-scale consequent on their reduced price. The amount of money saved to the consumers through the reduced price of gas was £3575 for the half year, or £7150 per annum; while the extra dividend to the shareholders was only £400, or £800 per annum. Thus, out of every £8000, only £800 went to the shareholders, and the balance, £7200, to the consumers. The items in the accounts correspond very nearly with those for the same half of the previous year. Coke had not sold so well—coal having been cheaper; and, in the total return for residuals, there was a small decrease. The accounts further showed that the upkeep of the works, and meters, stoves, fittings, and maintenance of incandescent burners had been maintained. During the past year, the Company had had to adopt a new system of purification, which had cost extra money, as well as being a source of great anxiety and trouble to the staff. They had been successful at it; but a great amount of capital had to be expended to provide for the extra area of purification. He was happy to be able to tell them that he hoped this extra cost would be shortly removed. A Bill was now before Parliament by the London Gas Companies, and also one by the London County Council—both of them tending in the same direction—which would diminish their anxiety with this extremely costly, and he might also say, exaggerated system of purification. A Departmental Committee of the Board of Trade, presided over by Lord Rayleigh and consisting of very scientific men, said that such extreme purification was unnecessary. During the past half year, an exhibition of gas appliances had been held, and to which the Company had given a trifling financial assistance. The exhibition had been under the guidance of the Institution of Gas Engineers; and they had paid him (Mr. Jones) the compliment of making him President of the exhibition. He had very little to do with the exhibition, because he had to go to America; and he had also purposely avoided interfering with the Committee—a very capable and hardworking Committee—of the members of the Institution referred to. The Committee included such names as Mr. James W. Helps of Croydon (the Chairman of the Committee), Mr. Charles Carpenter, Mr. S. Y. Shoubridge, and Mr. Charles Hunt, formerly of Birmingham. The exhibition had been one of the most remarkable successes of recent times; and a substantial recognition was due to Mr. Helps for his invaluable services in this matter. The public had been able to see what a brilliant light it was possible to obtain by the use of gas. No less than 3500 of the Company's consumers had availed themselves of the admission tickets which the Company had issued gratuitously. The effect of the exhibition was the immediate reaction upon gas securities; and market prices were better now than they had been for the past three years, and were again in the high position of four or five years ago, and which they were entitled to occupy. The sale of gas by the Company during the period under observation had increased by 4¾ per cent. This was not quite so much increase as they were used to, but it had not been a favourable period for the other London Companies. None of them reached a 3 per cent. increase except the Brentford and South Suburban Companies, who had increases of slightly over 3 per cent. He thought therefore their increase could be considered satisfactory. The increase in the number of consumers had been 1030, and 20 new public lamps had been erected, and 1028 new stoves had been fixed.

The DEPUTY-CHAIRMAN (Mr. T. A. Ives Howell) seconded the motion, which was carried.

The following rates of dividend were then declared: £7 15s., £6 5s., and £5 8s. 6d. per cent. per annum on the "A" consolidated stock, "B" consolidated stock, and "C" ordinary stock respectively. In each case, the amount included the extra dividend allowed on the sliding-scale—5s. per cent. per annum on the "A" and "D" stocks and 3s. 6d. on the "C" stock.

The retiring Directors, Mr. H. E. Jones and Mr. H. S. Freeman, and the retiring Auditor, Mr. John Hennell, were duly re-elected.

Mr. T. A. IVES HOWELL, in moving the re-election of Mr. Jones and Mr. Freeman, said he thought the Company were particularly fortunate in being able to have the benefit of the practical experience of these gentlemen, both of whom had been former Engineers of the Company.

Mr. WALTER HUNTER moved a vote of thanks to the Directors, staff, and workmen of the Company. He said the Company was very ably managed.

Mr. J. B. HOWELL seconded.

The CHAIRMAN suitably replied, and the proceedings terminated.

NEWCASTLE AND GATESHEAD GAS COMPANY.

The Annual Meeting of this Company was held at Newcastle on Wednesday last—Sir W. H. STEPHENSON in the chair.

The SECRETARY (Mr. T. Waddon) having read the notice convening the meeting,

The CHAIRMAN, in moving the adoption of the report, said he was pleased to be able to congratulate the shareholders upon the satisfactory state of affairs, so far as the working of the Company was concerned. The total receipts had been £376,527, against £378,073 the previous year, or a decrease of £1546, while the expenditure had been £263,173, against £265,497, or a decrease of £2794. The profits for the last year were £113,354, against £112,106, or an increase of £1248. This was the biggest profit they had ever made. The increase was all the more remarkable when it was considered that the reduction of 1d. per 1000 cubic feet in the charge meant a sacrifice by the Company in favour of the consumers to the extent of about £10,000. Gas yielded £2075 less than in the previous year, meter and stove rentals £2426 more, coke and breeze £4843 more, tar £6471 less, sulphate £171 less, and sundries £98 less—showing a net decrease of £1546 upon the receipts. The expenditure on gas manufacture was: Coal and oil £2613 less than in the previous year, repairs and maintenance of works £3298 less, and salaries, wages, and purification £825 more, the total manufacturing charges being £5086 less, though 97 million cubic feet more gas was made. The distribution charges were £268 less; rents, rates, and taxes (an item they could not control, and which was constantly advancing and increasing) were £1274 more; and management and other charges £1284 more—making a net decrease of £2794 upon the expenditure. The demand for coke during the year had been well sustained. Tar, on the other hand, had not maintained its value, owing chiefly to the falling away in the demand for pitch. But he was glad to say that for the half year from July to December, there had been a considerable improvement. On the whole, they could not complain as to the yield from residuals, because it must be remembered that 1903 was an exceptionally good year. In 1904, there was an increase of £8980 on the results of 1902—an amount not accounted for by the increase of the make of gas last year. On coals, they had spent £6401 less owing to decreased prices. The quantity of gas sold during the year reached 2813 million cubic feet. Altogether it had increased 83 million feet, or rather more than 3 per cent., upon the previous year. Year by year the records had been broken. The increase in 1902 had been 2 millions; in 1903, 13½ millions; but in 1904, 83 millions. The largely-increased sales of 1904, therefore, showed that the use of gas was more and more popular; and it might be that the incandescent burner had become so general that the change from the extravagant old-fashioned flat-flame burner to the modern economical system had ceased to affect the total consumption, when compared with previous years. There had also been a considerable development in the use of gas-engines for power purposes and fires for heating and stoves for cooking; and there were also the automatic consumers, whose aggregate consumption assisted materially to swell the total output. No less than 7642 of these installations were fixed last year, which was the largest number put up in any year, with the exception of 1902, when 8203 were fixed. Clearly, therefore, the demand was not exhausted. There was a total of 27,083 of this class of consumer—which had all been taken on since November, 1900—as against 44,546 using gas on the ordinary terms. There were now 33,946 cookers fixed on loan; being an increase of 8382 during the year. These appliances ministered very advantageously to the success of the Company's business, inasmuch as they generally consumed gas in the day-time, and thus contributed to the economical working of the plant. The increase in the public lamps from 12,511 to 13,566 was also satisfactory. There were now 830 of the new forms of the Welsbach self-intensifying type in the Company's area. They were of a very satisfactory character indeed. Each burner gave a light of 300 candles; and, by grouping more burners in one lantern, the light could be increased to any reasonable extent. The amount spent on capital account on new works during the year had been £100,936, made up as follows: New buildings and machinery, £7211; distributing mains, £62,353; and meters and stoves on loan, £31,372. The total had been reduced by the sum of £65 capital duty returned by the Inland Revenue Department. The expenditure upon the capital account was larger than was anticipated at the last meeting; but the increase had arisen in consequence of the Company having fixed about 3000 more automatic installations than estimated, and the extending of mains to a greater extent than was calculated would be necessary—nearly double the number of miles have been laid as were laid in the previous year. It was confidently anticipated, however, that the expenditure would all be remunerative. As to the Hebburn boundary question, which had long been a cause of dispute between the Newcastle and Gateshead Company on the one hand and the South Shields Gas Company on the other, since 1866 there had been an imaginary line drawn from one point to another as the boundary dividing the areas of the two Companies; and it could be readily understood that as streets of houses were formed along the line, difficulties would, and did, in fact, arise. But as the South Shields Gas Company had a Bill before Parliament last year, the Newcastle Company got a clause inserted which had firmly and concisely defined the boundary line; and he thought all further trouble had been removed. With regard to stoking machinery, the installations in three out of the four retort-houses at Redheugh had contributed so materially to the reduction of carbonizing expenses, that the Directors had decided to instal stoking machinery in the fourth and last house there. Referring to the proposed reconstruction of the Elswick works, he said this was the oldest existing manufacturing station of the Company. It was built about the year 1859, and upon the site of a reservoir belonging to the Whittle Dene Water Company. The large double retort-house required entire reconstruction, to enable the Company to take advantage of the more modern methods of carbonization and to reduce the working costs in a manner similar to what had been done at Redheugh. The cost of the alteration would, he was afraid, be considerable; and this was the reason why the Directors had during the last two years carried substantial amounts to the reserve fund, because a proportion of the cost of reconstruction would have to be paid for out of revenue. A start with the work would probably be made next year. The alterations would certainly be for the benefit of revenue, because the cost of carbonizing was so much more at Elswick than at Redheugh, where advantage had been taken of modern appliances. Something like 2s. 6d. per ton of coal carbonized was the difference between the two works, so that there was a large margin for improvement. During the year, improvements had been made to benefit the consumers. He referred to the reduction by 10 per cent. of the rentals charged for the hire of cooking-stoves; the discontinuance of the charge for laying service-pipes from the main to the stopcock, and the charge for fixing meters; the commencement of the supply of gas-engines upon the hire-purchase system, which was a development that had been exceedingly successful; and the free fixing and supply on loan and on hire-purchase terms of gas-fires, radiators, and other heating apparatus—the consumer being charged rent for the fires for only the two winter quarters. The scheme for the maintenance of incandescent burners had been enlarged; and the consumers had now the choice of two methods. The first was charging a fixed sum per burner per quarter irrespective of the attention and material required. The new arrangement was charging the retail selling price for the mantles and chimneys actually used; the fixing of the same and the cleaning of the burners and globes being done free. High pressure lighting had been considerably developed in the Company's area, a greater light being obtained for the same quantity of gas consumed. The Directors had determined to alter their table of discounts. The discounts hitherto allowed for prompt payment were 10 per cent. for quarterly accounts not exceeding 400,000 cubic feet, 15 per cent. up to 25 millions, and 17½ per cent. above that figure. The new discounts would be: Up to 100,000 cubic feet per quarter, 10 per cent.; up to 250,000, 12½ per cent.; up to 400,000, 15 per cent.; up to 1 million, 17½ per cent.; up to 40 millions, 20 per cent.; up to 80 millions, 22½ per cent.; and above that figure, 25 per cent. This would cost the Company between £6000 and £7000 per annum; but it was anticipated that the consumption of gas would be increased for heating, power, and other purposes. The saving to the Corporation of Newcastle would be over £1100, and to Gateshead over £350. The price of gas under the new arrangement would bear favourable comparison with other gas undertakings, for at 2s. gross the net prices would be, with 10 per cent. discount, 1s. 9·6d., and with 25 per cent. 1s. 6d. per 1000 feet. The Corporations, under the "most favoured nation" clause of the Act of 1896, would have gas supplied to them for the public lamps, as from the beginning of the present year, at 1s. 5·4d. per 1000 feet. With the additional discount, the annual cost of a self-intensifying lamp, such as they had in use, lighted during the same hours as an electric arc lamp was now lighted, would be £3 3s., for a light of 300 candles, whereas the electric arc lamp would cost £12 for a light of 700 candles—taking a very liberal calculation of the actual light given. And, moreover, the gas-lamp would be placed upon the foot-path, and thus give light where most required. As to the future, he looked forward with every confidence. The Company were taking no harm from competition—in fact, it had done them good. He concluded by thanking the members of the staff for their services.

The report was adopted; dividends for the half year were declared at the rates of 4 per cent. per annum on the preference stock and £4 12s. 6d. per cent. per annum on the ordinary stock; and the salary of the Secretary was raised to £1250 a year.

At an Extraordinary Meeting subsequently held, the following resolution was passed: "That in exercise of the powers of the Newcastle-upon-Tyne and Gateshead Gas Act, 1901, and the Acts therewith incorporated, the existing capital of the Newcastle-upon-Tyne and Gateshead Gas Company be increased by the creation of £100,000 of additional new ordinary stock, which will form part of the ordinary capital of the Company, and be entitled and subject to the same rights and incidents as, and rank *pari passu* in all respects with, the ordinary stock for the time being of the Company, and that such additional new stock be issued in accordance with the provisions of the said Acts at such times, and from time to time, as the Directors may think fit."

TOTTENHAM AND EDMONTON GAS COMPANY.

The Half-Yearly Ordinary General Meeting of this Company was held last Saturday at the Chief Offices, 639, High Road, Tottenham—Mr. CORBET WOODALL in the chair.

The SECRETARY (Mr. James Randall) read the notice convening the meeting.

The CHAIRMAN said, the meeting having been constituted, he had, before proceeding to the ordinary business, to refer to the fact that they were short of their ordinary number on that side of the table. Since the last meeting, when they re-elected Mr. James Warren to a seat at the Board, he had been taken away. Mr. Warren was one of a class of men comparatively small with whom it was impossible to associate the thought of guile. He had one way, and only one way, of proceeding to an end, and that was, the perfectly straight way. He (the Chairman) had sat with Mr. Warren on the Board for 22 years, and was now alone of those who constituted the directorate when he joined it in 1882. During the whole of that time, he could say that Mr. Warren never, he was sure, said an unkind word about anybody. His influence was always for good; and they would miss him greatly.

It was then agreed to take as read the report and accounts. The former showed that the profit earned in the half year was £17,107. The reduction in price from 3s. to 2s. 10d. per 1000 feet, as compared with the Christmas half year of 1903, was equal to £4016, or 5·89 per cent. Gas sold showed an increase over the corresponding half year of 57,212,000 cubic feet, or 12·45 per cent. After providing for interest charges, and passing £1000 to the credit of the insurance fund, there remained a balance of £26,204. The payment of the full statutory

dividends at the rate of 6¼ per cent. and 4¾ per cent. upon the "A" and "B" stocks respectively (both less income-tax), it was stated, would absorb £10,955, and leave a balance of £15,249.

The CHAIRMAN, in moving the adoption of the report and accounts, said he had again to congratulate the proprietors upon a condition of affairs which showed continued progress and prosperity. An increase in the production of gas in the year of 160 million cubic feet, of which 80 million feet was the proportion of last half year, was testimony to the growing character of the district, and to an increasing and constantly developing demand for gas. The manufacture during the winter had been conducted under circumstances which were peculiarly difficult; and, as a result, the working statements were not quite so satisfactory—they did not come up to the high standard to which they had been accustomed in this Company. The gas sold per ton of coal had fallen by some 600 cubic feet, as compared with the same period of last year. By "per ton of coal" he meant the coal including the oil used, which was reduced to a certain standard to represent tons of coal. The effect was that the unaccounted-for gas (which was 3 per cent. in the corresponding period of 1903) stood in the accounts for the past half year at 7 per cent. He felt sure this was only a temporary matter, due to causes some of which they understood, and the rest of which were under investigation. The future, he was confident, would see their return to the results of which they had hitherto been proud. On the other hand, the supply of gas to the district had been as full and satisfactory as ever, notwithstanding the record output of many days during the Christmas season. The loss of revenue consequent on the reduction in the price of gas had been met by increased business; and there was a margin of over £5000—that was to say, they had recovered the whole of the amount due to the reduction, *plus* £5000; and the profit-balance was only less than last year by £1000. The works and apparatus had been maintained in the fullest state of efficiency; and the capital showed a slight reduction (which was a reduction upon several recent reductions) in proportion to the business done. The ordinary consumers had increased in the year by 9¼ per cent.; the prepayment consumers, by 25 per cent.; and the number of stoves in use, by 13½ per cent. The Directors were taking in hand the maintenance of consumers' burners, mantles, and stoves, because, while these appliances, when properly maintained, were an excellent advertisement for the Gas Company, if they were allowed to be at all dirty and ill-kept they were an advertisement the other way. During the half year, they had disposed of £10,000 of 4 per cent. debentures, at a minimum price of £103; and £12,500 of "B" stock, at the minimum of par. They had now only £87,000 of capital to issue, of which the Directors were offering at the present time £12,500. The capital account showed they had overspent to the extent of £9000; and they owed their bankers £20,000. This indicated that a comparatively early application to Parliament would be necessary to increase the amount of the capital; and this application would probably be made in the course of the session 1905-6. He might say that they were not at all keen about reducing the amount (which might seem to some of the proprietors to be rather an alarming one) overdrawn at their bankers', because the terms on which they had this money for use were more advantageous to the Company than would be raising of additional capital. At the same time, it would not be prudent to add considerably to that item. He believed that, at the last meeting of the proprietors, he referred to an important Committee which had been sitting to investigate questions connected with the testing of gas in London. As a result of the report of that Committee, a Bill was before Parliament which proposed to give effect to the recommendations of the Committee, and to reduce the stringency of some of the requirements in existing Acts with regard to purification. These obligations, though they were not very costly, were burdensome upon the companies, and, in effect, injurious to their men. When the Bill was passed, the relief granted would undoubtedly be extended to companies outside London. Modifications which tended to sweeten the works, and improve the conditions under which the men laboured, would be very welcome, especially when, as in this instance, they would not impair the quality of the gas, which had hitherto been maintained by them in a manner of which they were somewhat proud. The new retort-house, to which reference was made at the last meeting, was now in process of erection; and they expected the retorts would be in full operation next winter. From that work they confidently looked for considerable economy in manufacture, which they hoped to commence to feel not in the current half year, but in the one following. He might say that, in his opinion, they were on the eve of further improvements in the methods of manufacture which would add materially to the strength and stability of the gas industry. He had nothing more to add. The accounts spoke for themselves. The Directors were, as was seen, increasing the amount of the carry forward; but, in the current half year, they would have to provide rather considerably for works put out of use, and which must consequently be paid for out of revenue. They were not, therefore, putting away too much. At the moment, they did not purpose suggesting a further reduction in price; but he hoped the time when they might do so was not very remote.

Mr. H. BAILEY seconded the motion, which was unanimously adopted.

Mr. D. FORD GODDARD, M.P., proposed the declaration of a dividend at the rates of 6¼ per cent. and 4¾ per cent. upon the "A" and "B" stocks respectively, both less income-tax. In his remarks, he said the only disadvantage under which the Company had had to strive, not merely during the past half year, but for several half years, had been the abnormal growth of the business—a thing they could not really complain of, but which constantly created difficulties not always easy to surmount, and which made working, on the most economical terms, a very troublesome matter indeed. When they could really fairly catch up the difficulties in the business, they would be able to work under much happier conditions than they were now. They were producing very fair results; but it was at the cost of a constant strain upon their officials and staff, who had to meet these unusual demands by expedients that sometimes did not result as happily as they could wish. As the balance-sheet showed, they had fairly earned the increased dividend which became due on account of the reduction in price last May.

Mr. G. T. WATSON seconded the proposition, which was agreed to.

The CHAIRMAN said he had to announce that, to fill the vacancy on the Board created by the death of Mr. Warren, the Directors invited Mr. James Cloudsley; and he accepted the invitation. Mr. Cloudsley was a resident of Tottenham; and the members of the Board were unanimously of opinion that it was desirable—particularly in view of the large increase of local shareholders, that they should have a Director resident in the district. And they felt that they were fortunate in being able to find one in a gentleman holding, as Mr. Cloudsley did, such a respected position in the municipal life of the place, as well as in its philanthropic and social work. He was, however, sorry to say that a few days since Mr. Cloudsley was knocked down by a motor car in the City, and was at present in bed suffering from the effects of the fall. Only that morning, however, he had heard from him, and he stated that he expected to be better soon, though he regretted exceedingly that he was prevented from attending a meeting to which he had been looking forward so much.

Moved by Mr. W. LANG, and seconded by Mr. W. BROWN, a cordial vote of thanks was passed to the Chairman and Directors and officers. In supporting it, Mr. H. D. ELLIS remarked, in reference to the overdraft at the bank, that he was glad to hear the Chairman say he regarded this with the utmost equanimity. He (Mr. Ellis) did so too; and he hoped no shareholder would think, when he saw on the debit side of the balance-sheet "Temporary Loan from Bankers, £20,000," that this indicated anything but the very good credit the Company had. He had been connected, in an official capacity, for more than a quarter of a century with a Company who habitually traded on borrowed capital. They knew what excellent finance it was paying a low interest instead of a high rate of dividend; the consequence being that they were able to maintain a fair rate all round.

The CHAIRMAN, in the course of his reply on behalf of the Board and the officers, said he was sure it would be a consolation to their Engineer (Mr. A. E. Broadberry), when they did occasionally drop below their best record, to know that they had at any rate a tolerant body of proprietors, who would believe that the drop was due to circumstances beyond control.

A vote of thanks was also passed to the Auditors (Messrs. E. Crowe and J. L. Chapman).

BRENTFORD GAS COMPANY.

The Half-Yearly Ordinary General Meeting of this Company was held on Friday at the Charing Cross Hotel, W.C.—Mr. HOWARD CHARLES WARD in the chair.

The SECRETARY (Mr. W. Mann) read the notice convening the meeting; and the Directors' report and accounts were taken as read.

The CHAIRMAN, in moving their adoption, said the half year under review showed very satisfactory results; but, when comparison was made with the half year ending Dec. 31, 1903, so much profit was not seen, and for good and sufficient reasons. In the first place, they made a reduction, at Lady-day last, of 2d. per 1000 cubic feet in the price of gas; and this 2d. took more than £8000 off the rental of gas in the half year. This £8000 was a considerable amount to take from the profit of a half year. But the drawbacks of the half year had not been confined to this reduction. He thought it had been the general experience that the price and amount received for coke, tar, and ammoniacal liquor had been considerably less during last half year than during the corresponding half of 1903. In their case the reduction of coke and tar had been altogether £4400; while the reduction in ammoniacal liquor had been only £14. A great deal of this was consequent on an old contract, and things of that kind; but the price of coke and tar had fallen considerably everywhere. The proprietors would see from this that, supposing they had had no increase of business, they would have had £12,000 taken off the profits, as compared with what was made in the half year ending Dec. 31, 1903. Towards meeting this, they had had a fair increase in business; but not such an increase as they could wish to have, and would have again. But they had had an increase of nearly 4 per cent.—3·81 per cent. to be accurate—and had had some slight benefits in the manufacture, although almost every item (especially repairs and maintenance of works and machinery and mains in the outdoor department) had been charged in the half year with all that could possibly be charged. They had also the benefit of what they did in the previous half year when they charged very liberally. The result of the half-year's working was that they made their interest and dividends, and had a surplus of £3890. If they took the whole year, they had a total surplus, after paying the dividend and interest, of £9858. Out of this, they had to pay ½ per cent., as they usually did, and very wisely, he thought, to the reserve fund. This amounted to £3400; and the Directors again proposed to place £1000 to the insurance fund, which would leave them with £5468 to deal with, either by adding to the undivided profit, or to be dealt with in some other way which would be to the advantage of the Company. As a matter of fact, they had now so many customers that they were obliged to increase their offices very considerably. It was rather a funny result of modern means of transit, that the customers were brought by the electric trams to the offices to pay their accounts in such large numbers that they had hardly room to receive them, and so the Directors were obliged to enlarge the offices. The work would cost them some £5000 or £6000. This would not bring income to the Company directly, and so it would be advisable, if they could persuade the Official Auditor to allow it, to charge the cost to depreciation or something of the kind. The undivided profit account, by the way, now amounted to £57,833—that was after adding the £1000 to the insurance fund, and putting £3400 to the reserve fund account. During the half year they had to lament the loss of one of the members of the Board, Sir Richard Wyatt, who was much esteemed, and was known to most of the proprietors. What made his death especially sad was its painful manner. He was really burnt to death in his bed by an accident. They all very much regretted his

loss. They had replaced Sir Richard by a gentleman well known to the Directors, and well known to him (the Chairman)—Major Alex. Cowie, R E., whom they knew would be a *persona grata*, and a good man of business, and, as an engineer and an officer, he was in a position to deal with engineering generally, which was a good qualification in a Company such as theirs. The proprietors had heard, no doubt *ad nauseam*, of the important gas exhibition held at Earl's Court during the half year, which had shown the various uses to which gas could be applied. It had been a great success, and for the gas industry generally he had no doubt it would also be so. This reminded him of the incandescent gas-burner. The effect of its use was peculiarly favourable to the gas consumer, and, of course, everything that popularized gas was favourable to the gas companies. But it had this effect, that the consumer got two or three times as much light without any more expense; and, in point of fact, he got a much cheaper light from his gas than he could get from electricity. It had, however, the further effect of preventing such a large increase in the gas-rental of the Company as they would otherwise have. Another thing which showed up rather in their accounts was the decrease in the average consumption of the prepayment meter consumers. He supposed that this showed the people who used these meters were not at present quite so well-to-do, and had not so much money to spend. He was speaking to a great authority on gas matters about this—Sir George Livesey—and he said he believed it was due to the incandescent mantle. He (the Chairman) did not know whether it was so or not; but he should have thought these slot consumers did not use incandescent mantles much because, although mantles were being better made than they formerly were, still they did not like rough handling. They had in use another kind of prepayment meter—the current-price meter. For these, the customers paid a rent, and dropped in a shilling at a time. It was particularly interesting to see that the increase in the consumption under this current-price system in 1904 was 14,661,000 cubic feet, which was an increase of 51 per cent. on the amount that was used through these meters in 1903. It was peculiar that in the penny-in-the-slot meters the average consumption had gone down very much; while in the others there was this enormous increase.

Mr. Ulick J. Burke seconded the motion.

Mr. H. D. Ellis congratulated the Board on the excellence of the accounts. The Company had been working practically without any capital expenditure; and of the 2d. reduction in the price to the consumers, they had recouped themselves 1¼d. by the increase of business. The Directors, too, had charged liberally to wear and tear; and yet in spite of all this they had the handsome balance of £99,783 available for dividends. Encouraged by the Chairman in the use of classical language, he might say *Surgit amari aliquid medio de fonte deporum*; and the drop of bitterness in his (Mr. Ellis's) cup was that the Directors had not thought fit to recommend a higher dividend than 12 per cent., while selling at a 13 per cent. dividend price. They could have given the proprietors another ½ per cent., and then carried forward an increased amount.

The Chairman said they could not do more than they were legally entitled to. Before they could pay an increased dividend, they must in their case have the reduced price in operation twelve months.

Mr. Ellis said if that was the interpretation of it, he had nothing more to say. He had no notion that these antiquated restrictions applied to this sliding-scale Company.

The Chairman said he knew in some cases the sliding-scale was made to operate on a six months' reduction. In their own case, they were lucky in having a valuable Act; and they did not wish to go to Parliament just for this purpose. It was the same sort of thing that occurred on the Stock Exchange in connection with the Gaslight and Coke Company. They were up in arms there because the Company did not put up the dividend. But they had no legal power to do it.

Mr. Ellis pointed out that the Commercial Company were working under a still more ancient Act—1847; and they were allowed to divide not only on a half-year's reduction in price, but a quarter-year's.

The Chairman (jocularly): You were always a lucky people; and a very efficient people. I congratulate the Commercial Company.

The motion was unanimously carried.

Moved by the Chairman, and seconded by Mr. Burke, a dividend was declared at the rate of 5 per cent. per annum on the 5 per cent. preference stock, 12 per cent. per annum on the consolidated stock, and 9 per cent. per annum on the new stock.

The Directors retiring by rotation were Mr. J. W. Field and Major Cowie; and they were unanimously re-elected.

The Auditors (Mr. Monier F. Monier-Williams and Mr. Alfred Bevis) were also re-appointed.

The Chairman remarked that the Board, viewing the services of the gentlemen by whose especial energy these good accounts had been brought about, thought they deserved some sort of tribute at the hands of the Company. The reward of the Engineer and General Manager was in the hands of the Board; and they had lately added £150 a year to Mr. Husband's salary. It was now proposed to give the Secretary an additional £100. He (the Chairman) had much pleasure in moving this.

Mr. Burke seconded the motion; and it was unanimously adopted.

On the proposition of Mr. A. W. Oke, seconded by Mr. J. Reeson, the Chairman, Directors, and officers were heartily thanked for their services.

Gas Lighting at Port Talbot.—About two years ago, the Margam Urban District Council took up the question of public street lighting in this new and rapidly-growing seaport town, and a scheme of electric lighting was adopted by the Council, at a cost of £15,000; but sanction to borrow the amount required was refused by the Local Government Board. Another scheme for the supply of electric current in bulk from the South Wales Electric Power Distribution Company at 1½d. per unit, has also been adandoned. The Aberavon Corporation, who have the powers of gas supply in this area, have now offered to provide gas at 3s. 4d. per 1000 cubic feet for a term of ten years; and the offer has been formally accepted. It is estimated that about 200 lamps will be put up by next winter.

SHEFFIELD UNITED GAS COMPANY.

Half-Yearly Report and Accounts.

In the report the Directors of the Sheffield Gas Company will present at the half-yearly meeting on the 13th prox., they call attention to the falling off to the extent of £10,949 in the receipts for gas. This amount, however, is more than accounted for by the reduction of 2d. per 1000 cubic feet which has been in force since Jan. 1, 1904. The prices charged during the past half year were 1s. 8d., 1s. 6d., and 1s. 4d. per 1000 cubic feet, according to consumption. The Directors regard the results of the operations for the past six months as satisfactory; and the accounts show receipts to the amount of £110,605 from the sale of gas, £58,634 from residuals, and a total revenue of £178,512. The expenditure being £125,654, there was £52,858 to go to the profit and loss account, bringing up the net balance to £113,475. The profit on the working during the period covered by the accounts allows of the payment of the usual dividends, with a remainder of £9884. Having regard to the prosperous condition of the Company's finances, the Directors felt justified, as announced in the "Journal" last week, in making a further reduction for gas of 2d. per 1000 cubic feet in the charges, to take effect from the dates of the readings of the meter indices for the March accounts. This reduction, they point out, will benefit the consumers to the extent of £22,620 per annum; and they think it should act as a stimulus to the increased use of gas, not only for lighting, but also for cooking-stoves, fires, gas-engines, and the many other trade purposes for which it is an economical, an ever-ready, and most suitable fuel. The Directors conclude their report by stating that Sir John Aird and Sons have completed the construction of the new gasholder tank at Neepsend, and the contractors for the holder are making good progress with their work, which is to be completed by the 31st of August next.

CROYDON GAS COMPANY.

Half-Yearly Report and Accounts.

The report which the Directors of the Croydon Company will submit at the half-yearly meeting next Friday opens with the gratifying statement that the sales of gas continue to increase—being, in the six months ending December, 7·32 per cent. in excess of those for the corresponding period of 1903—while the number of consumers and of stoves on hire also shows satisfactory growth. It then goes on to refer to the Earl's Court Exhibition, which the Company supported in conjunction with many others; and the Directors expressed the belief that "good results to the gas industry will follow from what was done in the direction of making known the great improvements effected during recent years in appliances for the use of gas from the points of view of economy, efficiency, and decorative effect." The Company sent to each consumer a circular drawing attention to the exhibition and bearing free admission tickets; and they mention that of the latter 2302 were used. The Directors were some time ago approached by the Caterham and District Gas Company with a view to the amalgamation of the two undertakings. Negotiations were entered into which resulted in an agreement for the joint promotion of a Bill to effect this. The Directors believe that the terms arranged, while giving an immediate and substantial advantage to the Caterham Company's consumers in the reduced price of gas, will in the early future—owing to the increase of consumption to which they look forward—prove beneficial to the whole undertaking. After providing for all fixed charges, writing off £1000 in respect of the old Carshalton works, and carrying £2000 to the renewal fund, the Directors recommend that dividends be declared for the half year at the following rates per annum: 14½ per cent. on the "A" stock, 11½ per cent. on the "B" stock, and 10¾ per cent. on the "C" stock, all less income-tax. After payment of these, there will be left a balance of £5573.

The accounts accompanying the report show that £18,469 was spent in the past half year on capital account, including £7534 for new buildings and plant, and £7841 for new mains, service-pipes, &c. According to the revenue account, the sale of gas produced £66,879, compared with £63,363 in the second half of 1903 (including metered supplies to local authorities and special accounts); rental of meters and stoves, £6154, against £5563; residual products, £17,812, compared with £19,694; and the total receipts were £90,939, against £88,703. The chief items of expenditure are: Manufacture of gas, £44,883, against £46,421; distribution, £12,119, compared with £10,915; and management, £3413, against £2944—the total expenditure being £68,288, compared with £66,427. The balance carried to the net revenue account is £22,651, against £22,276 this time last year; and the sum available for distribution is £23,872, compared with £20,473. The working statements show that 32,580 tons of ordinary coal, 2 tons of cannel, and 521,490 gallons of oil were used in the production of 520,968,000 cubic feet of gas, of which 491,527,400 cubic feet were sold and 497,443,600 cubic feet accounted for. The estimated quantities of residual products were: Coke, 19,549 tons; breeze, 5809 tons; tar, 454,913 gallons; and ammoniacal liquor, 967,793 gallons. The estimated quantity of sulphate made was 344 tons.

The New Gas-Works for Strabane.—Last Tuesday a special meeting of the Strabane Gas Committee was held for the purpose of hearing a report from Mr. Charles Hunt, the Engineer for the new gas-works scheme, regarding the progress of operations. Mr. Hunt said that on the whole he was satisfied, and he was sure that when finished the work would meet with the approval of the Council. The Chairman (Mr. James M'Ivor) said that a good deal of talk was going on as to the expenditure. He wanted to know from the Engineer whether it would take all the money—£12,000—to finish the work. Mr. Hunt replied that, after paying for everything, they would have a substantial sum left—he should say about £1800.

PROVINCIAL GAS AND WATER COMPANIES.

Gas.

Steam-Rollers Cause Leakage at Barnstaple.

Presiding at the annual meeting of the Barnstaple Gas Company, Mr. W. C. Rafarel congratulated the shareholders on the satisfactory results of the year's working. The total income amounted to £9142, and the expenditure to £7176—a difference of £1966. The net profit was £1742; and after paying the maximum dividends of 10 and 7 per cent. on the two classes of shares, there was a balance of £217 to be carried forward. The Chairman said the mildness of the season had affected the consumption of gas, and there had also been a decrease in the income from the public lighting. On the other hand, the revenue from meters and stoves, as well as from residuals, showed an increase. There was a net decrease in the revenue for the year of £278, which was more than accounted for by the lessened receipts for public lighting. The number of consumers had risen from 1413 in 1903 to 1525 last year; and there had been an increase of 117 in the sale of cooking-stoves. Some discussion took place respecting the unaccounted-for gas, which was said to be about 10 per cent. of the total quantity made. The Chairman said some part of the increase in the apparent waste was explained by the meters being taken at an earlier date than usual. Leakages from the mains or services, of which there was some complaint, were to be explained by the fact that the roads were rolled by steam-rollers.

A Successful Year and Increased Dividend at Derby.

It must have been a cause of keen regret to the Chairman of the Derby Gas Company (Mr. H. Swingler) that he was prevented by ill-health from presiding at the annual meeting of shareholders last Wednesday, seeing that the accounts presented showed the results of the first year's working under the new Act, and that the report which he would have had to submit for adoption contained a recommendation that an extra dividend of ½ per cent. should be declared, making 5½ per cent. for the year. However, Colonel Gascoyne (the Deputy-Chairman), who filled the position usually occupied by Mr. Swingler, gave the meeting some interesting particulars in connection with the working of the Company. The sale of gas during the year increased by 30¾ million cubic feet, or at the rate of 5½ per cent., though trade was dull at Derby, as in most other towns. The increase in the ordinary gas consumption amounted to 9½ million cubic feet, in prepayment consumption to 19¾ millions, and in gas used for power to 3 millions. On the other hand, there was a decrease of 1½ million cubic feet in the quantity of gas used for public lighting. The figures for the year were as follows: Ordinary (quarterly) consumers, 430 millions; prepayment consumers, 78¼ millions; public lighting, 35½ millions; and gas for power, 41 millions—total, 584⅜ millions. Though some gas companies have had decreases in the receipts for residual products, the coke, tar, and sulphate of ammonia per ton of coal carbonized more than compensated for this in the case of Derby. The residuals, in fact, yielded 78 per cent. upon the cost of the coal; being the highest figure on record. The Chairman gave some interesting figures on this matter. Taking two periods of five years each, from 1895 to 1899 inclusive, the total net receipts for residuals amounted to £62,622, being an average of £12,524 a year; whereas from 1900 to 1904 they were £109,929, or an average of £21,986 a year—being an increase of no less than £9462 per annum. Allowing for the larger bulk of coal used, amounting to 12 per cent., it leaves a net gain of more than 63 per cent., or £7890 per annum, due largely to improved methods of manufacture and working introduced by the Engineer (Mr. J. Ferguson Bell). With regard to the financial position of the Company, the total revenue last year was £98,610, and the expenditure £71,058; leaving a balance of £27,552 to go to the net revenue account. The sum available for distribution was £15,429; and the payment out of it of the dividend recommended was sanctioned. At an extraordinary meeting which followed, the Directors were authorized to raise, when necessary, the sum of £125,000 of new ordinary 5 per cent. stock, under the powers contained in their last Act. A noticeable feature in connection with the working of the Company is that, again taking a period of ten years, the capital employed per million cubic feet of gas sold has decreased from £814 in 1894 to £680 in 1904, and this although it requires considerably more capital to work a gas undertaking than formerly, on account of the prepayment consumers. Last year the Company spent £8000 on stoves and £2300 on meters, all of which was to a large extent for consumers of this class. Altogether, the proprietors have every reason to be satisfied with the position of the Company; while the consumers have no cause to complain that they are disregarded.

Growing Business in North London Suburbs.

At the meeting of the Southgate and District Gas Company last Thursday, the Directors reported that the quantity of gas sold in the six months ending the 31st of December exceeded that of the corresponding period of 1903 by rather more than 2 million cubic feet, or 4 per cent.; the rental being correspondingly greater. The half-year's revenue amounted to £12,086, and the expenditure to £9443; leaving a balance of £2643 to go to the profit and loss account. After providing for the interest on the debenture stock, the duty on the new capital, and part of the cost of the Company's Act, the balance of profit available for distribution was £3755; and the Directors recommended the declaration of dividends at the rates of 10 and 7 per cent. per annum on the original and additional capital, and of 5 per cent. per annum on the preference capital. These would amount to £2255, and leave a balance of £1500 to be carried forward. At their meeting the preceding day, the Directors of the North Middlesex Gas Company reported an increase of 2,334,500 cubic feet, or 3·6 per cent., in the sale of gas in the latter half of last year, compared with the corresponding period of 1903. There was also a slight increase in the revenue from residual products. Considerable extensions of mains were made during the half year, and the distributing system was materially improved. Reference was made to the fire which occurred on the works in December; but the Directors say the damage resulting was not serious, and was covered by insurance. By an agreement between the Company and the Hendon Urban District Council, the public lamps have been altered to the incandescent system, and are now maintained by the Company. The profits for the six months were £3671. Adding the interest received on deposits and the balance of the profit and loss account brought forward, there was a total of £5703. After providing out of this for interest charges, a balance of £5215 remained for distribution. The Directors accordingly recommended the payment of dividends for the half year at the rates of 5, 10, and 7 per cent. per annum, on the preference, ordinary, and additional capital; and that the sum of £390 should be carried to the reserve fund. These payments would amount to £3193, and leave £2022 standing to the credit of the profit and loss account.

Business Flourishing at Scarborough.

There was a very satisfactory meeting of the Scarborough Gas Company on the 11th inst. In the first place, the Directors were able to recommend the payment of the usual dividends on the ordinary stocks, the addition of £3530 to the reserve account, and the carrying forward of £1598. In view of the excellent condition of the Company's affairs, they had decided to reduce the price of gas to ordinary consumers in Scarborough by 2d. per 1000 cubic feet, and to those in Scalby by 6d. The Chairman (Mr. B. Fowler), when moving the adoption of the report, availed himself of the opportunity of bringing the Company's satisfactory position before the proprietors, and congratulating them upon it. He said the sale of gas increased steadily; the quantity sold in the twelve months ending Dec. 31 being 290,313,500 cubic feet, or about 2 millions more than in 1903. The extra revenue derived from the sale of gas was £412. The number of consumers was also steadily augmenting; the total on the 31st of December being 9298, or an increase of 335 during the year. The total income from all sources was £363 above that for 1903. On the other hand, the expenditure was £964 more. One item of increase was for the public lighting, which was £325 higher than in the preceding year, arising chiefly from the renewal of street lanterns and the further extension of incandescent lighting. Contrary to what was generally thought, the incandescent lamps in the town were worked at a loss, owing to the cost of maintenance. The result of the year's working was that, after meeting interest charge, dividend, &c., and transferring £3530 to the reserve account, which would then stand at £21,000, a balance of £1598 would be carried forward. Referring to the reduction in the price of gas, the Chairman said he thought the figures in Scarborough would compare very favourably with those in any other town in the country. In conclusion, he laid stress upon the fact that without a good and efficient Manager the business would be very difficult to carry on. Mr. Alex. Allan (the Manager and Secretary) had looked carefully through everything, and the results were there; and that was the greatest gratification Mr. Allan could feel. Mr. Butterworth seconded the motion. Mr. Moorhouse (of Wakefield) congratulated the Board on the balance-sheet, which, he said, was one that should make the shareholders very satisfied with their investment. He was pleased to recognize the great services of the Manager. As had been said, the results were the strongest evidence of Mr. Allan's capacity and energy. Last year he (the speaker) mentioned that he had been going through the analyses of accounts. He had been looking through them again this year; and he found among twenty companies—some much larger than theirs—that Mr. Allan produced a result which no one else showed. That was in regard to the number of cubic feet of gas he got out of a ton of coal. This was not surpassed by any gas undertaking he knew of. They also had a small leakage; and if it were not for the splendid management these results could not be achieved. The report was adopted, and the dividends recommended were declared. Votes of thanks having been passed to the Chairman and Directors, and also to the Secretary, officials, and staff, Mr. Allan, replying on behalf of the latter, said he could assure the shareholders that everyone in the employ of the Company was doing his best for the welfare of the concern. Not only the officials, but the workmen also, seemed all to have their hearts in their work.

A Good Half Year at Wakefield.

The half-yearly meeting of the Wakefield Gas Company was held on Monday last week, when the Chairman (Dr. Statter, J.P.) gave an interesting statement of the result of the working in the six months ending the 31st of December. He showed that, notwithstanding the competition of the electric light, the dividend had been earned, and a balance of £479 remained to be added to the already existing balance of £2839; making a total of £3318 after the dividend had been paid. The fog in December, which proved so troublesome to many people and trade generally, enabled the Company to beat all previous records with respect to consumption. From the 5651 slot meters there had been received 2,241,973 pennies, representing a consumption of 36,471,500 cubic feet of gas during the year. The accounts showed that the revenue for the six months was £21,938, and the expenditure £14,908; leaving £7030 to be carried to the net revenue account. The amount available for distribution was £9699; and the dividends recommended—viz., at the rates of 11½, 9, and 8½ per cent. per annum—for the half year was unanimously adopted. The usual vote of thanks was accorded to the Chairman and Directors; after which the Chairman moved, and Mr. Moorhouse seconded, a vote of thanks to the Engineer (Mr. H. Townsend, M.Inst.C.E), the Secretary (Mr. W. H. Parker), and their respective staffs. When acknowledging the vote, Mr. Townsend paid a warm tribute to the excellent conduct of the Company's foremen and workmen during the exceptionally heavy week before Christmas.

Water.

How Consumers are Studied in Chester.

That water companies are not always actuated by a desire to get as much as they can out of the consumers while doing as little for them as possible, is made evident by the remarks of Mr. F. E. Roberts, the Chairman of the Chester Water Company, in moving the adoption of the Directors' report at the recent half-yearly meeting, when a sum of £10,514 was available for distribution, and the usual statutory dividends, amounting to £2077, were recommended. After alluding to the epidemic of typhoid fever at Lincoln—a city which he said might

compare to an extent with Chester—Mr. Roberts quoted figures indicating the progress of the Company. Under their Acts, they were not bound to furnish a continuous supply of water on Sundays. Since the year 1889, however, they had given such a supply on Sundays and on every other day. They were not bound to give pressure which would raise water more than a few feet higher than the streets in the city; but about twelve or fifteen years ago they altered the tanks, and were now enabled to raise it practically to the height of the outskirts of the city. About the same date they abolished the charges for water-closets. In the year 1898, they took off the charge for baths; so that wherever there was a bath now the owner of the house or the occupier had the benefit of it without extra expense. Considering that in these days of sanitary science the bath was regarded as so essential, this consession was an unspeakable advantage. In addition to this, during the last twenty years they had been gradually extending their filtration area, and improving the construction of their filters. A deputation of scientists who inspected them six months ago had expressed their thorough appreciation of the Company's arrangements in this respect. They were now fitted up with appliances by which the quality of the water could be tested at each bed; and if there was anything wrong, it would be detected at once. In connection with their lower works, they had obtained a supply of spring water which on analysis proved to be exceedingly good, and which protected them against any difficulty arising from a state of flood in the river, an exceptional tide, or any other mischief that might arise. He was glad to say the Company now saw their way to make a concession which practically was a material benefit to the town. They were prepared to allow a rebate of 5 per cent. in respect of all domestic water-rates, provided they were paid within one month from the beginning of the quarter. This concession would be available after June; and it would represent about £600 a year. The report was adopted, and the dividends recommended were declared.

Record Increase in Water-Rental of the Colne Valley Company.

Reporting to the shareholders in regard to the half-year's working to Dec. 31, the Directors of the Colne Valley Water Company stated that the capital expenditure during the six months amounted to £2283, the principal part of which was, as usual, for the extension of mains. It had been decided, on the advice of the Engineers, to substitute for the two remaining old horizontal engines, a powerful beam-engine of modern type; and also, in view of the continual demand for additional supplies of water (especially in the summer months) to increase the available yield of the wells. The profit in respect of the revenue account for the half year amounted to £11,285; and the balance of the dividend and interest account, after paying the usual interest on the debenture stock and preference shares, was £10,650. From this, the Board determined to transfer £1000 to the contingency fund, and to recommend the payment of a dividend at the rate of 8 per cent. per annum on the 10 per cent. maximum shares and 7 per cent. on the 7 per cent. maximum shares—leaving £1419 to be carried forward. In moving the adoption of this report at the half-yearly meeting last Tuesday, the Chairman (Mr. C. E. Keyser) remarked that the Company were making very satisfactory progress. The total amount payable in water-rates for the six months was £17,062, as against £15,625 for the corresponding half of 1903, or an increase of £1437. Adding the increase in the first six months of 1904 as compared with 1903—£1292—they arrived at a total increase for 1904 of £2729. This increase for the twelve months constituted a record; the previous highest figure having been in 1899, when it was £2661. The number of new supplies added during the last half year was 394, estimated to yield £1045 a year, and making a total for the year of 716 new supplies, and an estimated water-rental of £1882. This was quite up to the average of the past few years. The number of applications for building supplies was satisfactory; the total amount received for same during the year having been £1050, or £200 more than in 1903. Apparently, therefore, the temporary depression in the building trade had come to an end. A year ago, the Directors remarked that perhaps building in the district had been overdone, and many houses were unoccupied; but they were glad to see that this state of affairs was now changed. With regard to expenditure, the increase in the cost of maintenance and management for the year 1904, as compared with 1903, was £665, of which about £250 was accounted for by the extra quantity of water pumped, and £160 by the repair of buildings at the pumping-station. The total expenditure was still very favourable; the percentage to gross income being 37¼. One reason for the Company's prosperity was the attention devoted to reducing waste; Deacon waste preventers being fixed all over the district. The total quantity of water pumped during the half year was 435½ million gallons, or about 25 gallons per head for domestic purposes. The Directors would have been able to recommend a larger dividend; but they had decided, as the rate was raised only six months ago, to suggest no increase this time, but to place £1000 (or double the usual amount) to the contingency fund, and to carry forward a more substantial balance—£1419. They were already paying the maximum on the 7 per cent. shares, and were getting on well towards the maximum on the 10 per cent. shares. When they reached that, they would be able to pay something on account of back-dividends on both classes of shares. In the course of the next two or three years, it was estimated that £20,000 would be spent on the new engine and well work referred to in the report; but a portion of this would be paid out of the contingency fund, in respect of the loss on the old engines. The Consulting Engineers (Messrs. John Taylor, Sons, and Santo Crimp) stated that the works were in a most satisfactory condition. In the course of the subsequent proceedings, a shareholder suggested that it would be a good policy to give the consumers a prior chance of taking up at a fixed price any new shares issued; but the Chairman said such issues were advertised, and consumers could apply for shares. There might be difficulties in doing anything beyond this in the direction named. The report was adopted; and the dividends recommended were declared.

More Consumers at Leatherhead.

The report submitted at the half-yearly meeting of the Leatherhead Water Company last week stated that the receipts for the half year to Dec. 31 amounted to £3990, and the working expenses to £2110, leaving a profit of £1880. To this had to be added £1351, the sum brought from the previous account, making a total of £3231. Deducting from this £187 interest on debenture stock, there remained £3044 available for division among the shareholders. Out of this, the Directors recommended a dividend at the rate of 8 per cent. per annum on the original shares, and the maximum dividend at the rate of 7 per cent. per annum on the remainder of the shares. This would absorb £1498, and leave a balance of £1545 to be carried forward. During the half year 62 new services were laid on. Reference was made by the Directors to the death of Mr. John Boustead, who had been on the Board since the formation of the

GAS COMPANIES' STOCK AND SHARE LIST.

Referred to on p. 483.

Issue.	Share.	When Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.				£ s. d.
590,000	10	Oct. 13	10½	Alliance & Dublin 10 p.c.	21½—22½	..	4 13 4
100,000	10	,,	7½	Do. 7 p.c.	14½—15½	..	4 16 9
200,000	5	Nov. 11	6½	Bombay, Ltd.. . . .	6½—6¾	..	4 16 4
140,000	5	,,	6½	Do. New, £4 paid	4¾—5¼	..	4 19 1
50,000	10	Aug. 31	14	Bourne-) 10 p.c. . .	29—30	..	4 13 4
251,810	10	,,	7	mouth Gas) B 7 p.c. .	16—17	..	4 2 4
53,200	10	,,	6	and Water) Pref. 6 p.c.	14½—15½	..	3 17 5
380,000	Stk.	Aug. 12	12	Brentford Consolidated	250 - 255	..	4 14 1
300,000	,,	,,	9	Do. New . . .	190—195	..	4 12 4
50,000	,,	,,	5	Do. 5 p.c. Pref. .	130—135	..	3 14 1
206,750	,,	Dec. 15	4	Do. 4 p.c. Deb. .	105—108	..	3 14 1
220,000	Stk.	Sept. 15	11	Brighton & Hove Orig.	228—233	..	4 14 5
246,320	,,	,,	8	Do. A. Ord. Stk. .	168—173	..	4 12 6
460,000	20	Sept. 29	10	British	41—42	..	4 15 3
100,000	Stk.	Aug. 12	6	Bromley, Ord. 5 p.c. .	117—122	..	4 18 4
165,700	,,	,,	4½	Do. do. 3½ p.c.	92—95	..	4 13 9
500,000	10	Oct. 13	7	Buenos Ayres (New) Ltd.	11¾—12¼	+½	5 14 3
250,000	Stk.	Dec. 30	4	Do. 4 p.c. Deb. .	94—96	+1	4 3 4
150,000	20	July 14	8½	Cagliari, Ltd. . . .	24—26	..	6 6 11
100,000	10	Sept. 29	10	Cape Town & Dis., Ltd.	16½—16¾	..	5 19 5
100,000	10	Oct. 27	4½	Do. 4½ p c Pref.. .	9½—10	..	4 10 0
50,000	50	Nov. 2	6	Do. 6 p.c. 1st Mort.	52—54	..	5 11 1
50,000	Stk.	Dec. 30	4½	Do. 4½ p.c. Deb. Stk.	100—102	..	4 8 3
1,400,000	Stk.	Aug. 31	5⅛	Commercial 4 p.c Stk. .	117—120	..	4 6 8
560,000	,,	,,	5	Do. 3½ p.c. do. .	113—116	..	4 6 2
450,000	,,	Dec. 15	3	Do. 3 p.c. Deb. Stk.	86—88	..	3 8 2
800,000	Stk.	,,	6½	Continental Union, Ltd.	117—120	..	5 8 4
200,000	,,	,,	7	Do. 7 p c. Pref.	140—145	..	4 16 7
424,070	Stk.	Feb. 18	5½	Derby Con. Stk. . . .	—	..	—
55,000	,,	Jan. 3	4	Do. Deb. Stk. . . .	108—110	..	3 12 9
486,090	10	Jan. 27	11	European, Ltd. . . .	21—22	..	5 0 0
354,060	10	,,	11	Do. £7 10s. paid	14½—15¼	..	5 6 6
15,243,200	Stk.	Feb. 10	4⅛	Gas-) 4 p.c. Ord. . .	93—101*	..	4 7 1
2,600,000	,,	,,	3⅜	light) 3⅜ p.c. max. .	92—94*	+1	3 14 6
3,799,735	,,	,,	4	and) 4 p.c. Con. Pref.	110—112*	+2	3 11 5
4,193,975	,,	Dec. 15	3	Coke) 3 p.c. Con. Deb.	89—91	+2	3 5 11
258,740	Stk.	Sept. 15	5	Hastings & St. L. 3½ p.c.	100—103	..	4 17 1
70,000	10	Sept. 29	11	Hongkong & China, Ltd.	16—17	..	6 9 5
3,800,000	Stk.	Nov. 11	10	Imperial Continental .	211—213	+1	4 13 11
473,600	Stk.	Feb. 10	3½	Do. 3½ p.c. Deb. Red.	96—98*	+1	3 11 5
175,036	Stk.	Aug. 31	6	Lea Bridge Ord. 5 p.c. .	118—123	..	4 17 7
561,000	Stk.	Aug. 31	10	Liverpool United A . .	224—226	..	4 8 6
718,100	,,	,,	7	Do. do. B . .	163—165	+1	4 4 10
£			p.c.				£ s. d.
306,083	Stk.	Dec. 30	4	L'rpool Unit'd Deb. Stk.	107—109	..	3 13 5
75,000	5	Dec. 15	5	Malta & Medn., Ltd. .	4—4½	..	5 11 1
560,000	100	Oct. 1	5	Met. of) 5 p.c. Deb..	103—105	..	4 15 3
250,000	100	,,	4½	Melbourne) 4½ p.c. Deb.	102—104	..	4 6 7
541,920	20	Nov. 11	3½	Monte Video, Ltd. . .	10½—11½	..	6 1 9
1,565,892	Stk.	July 29	4½	Newc'tle & G'tesh'd Con.	108—109	−¼	4 4 10
406,625	Stk.	Dec. 30	3½	Do. 3½ p.c. Deb.	90—92	..	3 16 1
15,000	10	Aug. 31	10	North Middlesex 10 p.c.	19½—20½	..	4 17 7
52,940	1	,,	7	Do. 7 p c.	13½—14½	..	4 16 7
300,000	Stk.	Nov. 30	8	Oriental, Ltd. . . .	148—151	..	5 6 0
600,000	5	Sept. 15	7	Ottoman, Ltd. . . .	5½—6½	..	5 12 0
235,005	Stk.	—	6⅔	Plym'th & St'house 5 p.c.	—	..	—
398,490	5	Apl. 28	5	Primitiva Ord. . . .	5⅛—6	..	4 3 4
796,980	5	Jan. 27	5	Do. 5 p.c. Pref. .	4⅞—5⅛	..	4 15 3
488,900	100	Dec. 1	4	Do. 4 p.c. Deb. .	94—96	..	4 3 4
851,070	10	Oct. 13	7	River Plate Ord. . . .	12¼—12⅝	..	5 9 10
300,000	Stk.	Dec. 30	4	Do. 4 p.c. Deb. .	94—96	..	4 3 4
250,000	10	Sept. 15	6	San Paulo, Ltd. . . .	12—12½	..	4 16 0
70,020	50	Jan. 3	5	Do. 5 p.c. Deb. .	52—54	..	4 12 7
135,000	Stk.	Sept. 15	10	Sheffield A	238—240	..	4 3 4
209,984	,,	,,	10	Do. B	237—239	..	4 3 8
523,498	,,	,,	10	Do. C	236—238	..	4 4 0
123,998	Stk.	Sept. 29	5	Shrewsbury Ord. 5 p.c.	104½—107½	..	4 13 0
70,000	10	,,	11	South African	16—17	..	6 9 5
6,250,000	Stk.	Feb. 10	5½	South Met., 4 p.c. Ord.	127—129*	..	4 5 3
1,832,700	,,	Jan. 13	3	Do. 3 p.c. Deb.	89—91	+1	3 5 11
575,020	Stk.	Aug. 31	5½	S'th Suburb'n Ord. 5 p.c.	123—126	..	4 7 4
60,000	,,	,,	5	Do. 5 p.c. Pref. . .	125—130	..	3 16 11
112,533	,,	Jan. 13	5	Do. 5 p.c. Deb. Stk.	130—135	..	3 14 1
502,310	Stk.	Nov. 11	5	Southampton Ord. . .	106—109	..	4 11 9
87,950	,,	—	4	Do. 4 p.c. Deb.	—	..	—
120,000	Stk.	Aug. 31	6¼	Tottenham) A 5 p.c. .	125—130	+2	4 15 2
338,720	,,	,,	4¼	and) B 3½ p.c. .	97—102	..	4 13 2
125,000	,,	Dec. 15	4	Edmonton) 4 p.c. Deb.	103—106	+1	3 15 6
182,380	10	,,	8	Tuscan, Ltd.	8¾—9¼	..	8 13 0
149,900	10	Jan. 3	5	Do. 5 p.c. Deb. Red.	97—100	+3⅛	5 0 0
30,000	Stk.	Aug. 31	7½	Wands-) A 5 p.c. . .	160—165	..	4 13 11
255,636	,,	,,	6¼	worth) B 3½ p.c. . .	133—138	..	4 10 7
60,000	,,	,,	5⅛	and) C 3½ p.c. . .	110—115	..	4 13 6
57,564	,,	Dec. 30	3	Putney) 3 p.c. Deb. Stk.	77—82	..	5 13 2
745,872	,,	Aug. 12	5	West Ham 5 p.c. Ord. .	104—106	+1	4 14 4
85,000	,,	,,	5	Do. 5 p.c. Pref. . .	122—127	..	3 18 9
160,000	,,	Dec. 30	4	Do. 4 p.c. Deb. Stk.	105—110	..	3 12 9

Prices marked * are Ex div.

Company in 1883. The report of the Engineer (Mr. F. S. Cripps) was to the effect that the supply during the six months had been satisfactory both in quantity and quality. About 600 yards of 6-inch and 1500 yards of 3-inch and 4-inch mains had been laid during the half year. Owing to the increase in demand in the Oxshott district, larger mains would shortly have to be laid in this direction. A new pumping-engine, engine-house, and accessories are at present in hand. The Chairman (Colonel Gleig, J.P.) said the profit was the highest they had ever had in one half year. The quantity of water pumped was nearly half as much again as in the corresponding period of the previous year. The enlargement and extension of the works and mains were absolutely necessary to enable the Company to keep pace with the demands.

A Good Year at Sunderland and South Shields.

Throughout the serious drought of last autumn, the Sunderland and South Shields Water Company were able to give a full supply in all their districts. This was the gratifying statement made by the Chairman (Mr. R. H. Gayner) in moving the adoption of the report at the annual meeting. The water-rents last year showed a gross increase of £3695; the balance on profit and loss account being £40,469. Out of this, dividends amounting for the twelve months to 9 per cent. on the ordinary and preference stocks, £6 6s. on the additional capital stock, and 4½ per cent. on the additional ordinary capital stock were declared. The report having been adopted, an extraordinary meeting was held at which the Directors were empowered to raise £100,000—part of the additional capital authorized by their Act of 1891. Subsequently the approval of the shareholders was obtained to the Bill the Company are now promoting for the construction of additional works and other purposes.

The Deficient Rainfall in the North.

In moving the adoption of the report at the annual meeting of the Weardale and Consett Water Company, the Chairman (Sir David Dale) said there had been an expenditure on capital account for the year of £32,758. There was £51,383 for disposal; and the Board proposed to pay a dividend for the year, including the interim dividends, of 5¾ per cent., clear of income-tax. They carried forward £8141, including the £7220 of undivided profit brought from the previous year. The profit was £52,796 in 1903, and £54,383 in 1904. There had been an increase of £1056 in working expenses, which were £22,123. This was largely accounted for by the increase in the rates and taxes—£763 for the year. As he remarked twelve months ago, this was becoming a serious item of expenditure. Through the deficient rainfall, they had twice had to give notice of a diminution of water for manufacturing purposes. For the five months ending Jan. 7 last, there had been only 5¼ inches of rain. In the corresponding time a year previously, there had been 18½ inches. The Directors considered it not necessary to proceed with the making of reservoirs for which they had parliamentary powers; for it was difficult to estimate what the future demand from the Consett and Weardale districts would be. The report was adopted.

THE MANAGEMENT OF THE WIDNES GAS-WORKS.

Substantial Increase in Mr. Isaac Carr's Salary.

A long discussion took place at last Tuesday's meeting of the Widnes Town Council upon a recommendation of the Gas, Water, and Electricity Committee that the salary of Mr. Isaac Carr, the Gas and Water Engineer, should be advanced from £750 to £900 a year, and that of Mr. A. T. Kyle, the Assistant Engineer, from £140 to £170.

In moving the adoption of the recommendations, Alderman Timmis, while approving of real economy, pointed out that it was quite possible to save a hundred or two a year in salaries and at the same time lose thousands over matters affecting the efficiency and niceties of management which had made the Widnes municipal plant such a success. The gas and water works were big manufacturing undertakings, and were conducing largely to what prosperity there was in Widnes. It was through able management and low prices that they made these commodities sell for the profit and the benefit of the town. During the last twelve months the make of gas had increased enormously, with the result that the Council made £6250 profit upon the gas account and £2400 on the water. One of the first ways in which they had taken advantage of their prosperity was to give an increase of wages to the stokers at the gas-works. In the form of free lighting, a sum equivalent to 3½d. in the rates had been presented to the town; and the balance of profits would be used for building up a reserve to reduce the capital account. That day Mr. Carr, through the Committee, asked, on behalf of himself and his assistant, that the town should share with them some of the benefits which had been largely earned through his able management. Mr. Carr was valuable, also, inasmuch as he made the engagement of a consulting engineer unnecessary. The Council had recently authorized the Committee to expend £70,000 on new gas and water works; and if they had had to employ an outside consulting engineer this sum would have been largely increased. They had saved the amount of this commission—roughly about £3500—by the ability of Mr. Carr. The proposed increases only amounted to £180 per annum altogether; and they had been saved this sum for twenty years in consulting engineers' fees over the new works. So they would see that the increase proposed had already been earned, and was in the ratepayers' pockets. Then the increases would come out of the gas profits, and no ratepayer would be called upon to pay anything. The gas consumer would not be affected. The price of gas in Widnes was 1s. to 1s. 4d. per 1000 cubic feet; and at Bury, which came out the next cheapest, it was 1s. 11d. If the Bury price was charged in Widnes, the consumers would have to pay £10,000 more per annum. The big manufacturing works of the Widnes Corporation were so finely balanced between profit and loss, and the place was run to such a nicety, that a little inefficiency would soon cause a deficit to be shown. The cheapness of Widnes gas and water was one of the greatest inducements possible to bring works to the district, and was,

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perhaps, one of the chief reasons why the United Alkali Company had taken up their quarters as the largest ratepayers and consumers of the municipal commodities. In conclusion, he quoted a great many figures in support of the Committee's proposals.

The motion having been formally seconded, Mr. Wood brought forward an amendment that the increase in Mr. Carr's salary be not granted—urging, as did his seconder (Mr. Bullough), that, taking into account the right to undertake outside practice, the Engineer was already sufficiently paid for his services. Another speaker remarked that he had nothing to say against Mr. Carr; but unless he got the gas down to 6d. per 1000 cubic feet, he did not feel that he could support a further increase in salary. Mr. Lewis, on the other hand, thought the Committee's case unanswerable, and pointed out that since 1900 the consumption of gas had increased by 64 million cubic feet per annum, and that the capital of the undertaking now represented four-sevenths of the corporate estate. It was clear that they had an efficient servant, both from a commercial and a technical point of view. Other members having spoken, Alderman Timmis, in reply, said that Mr. Carr's private practice did not cause him to neglect his duties in any way.

On the amendment being put to the meeting, eleven voted for it, and the same number against. The Mayor thereupon gave his casting vote in favour of the proposition, and declared the amendment lost. The minutes were then confirmed.

EXTENSIONS AT THE SOUTHPORT GAS-WORKS.

Adoption of the Regenerative System.

At the Meeting of the Southport Corporation last Tuesday, sanction was asked by the Gas Committee to an expenditure of £7000 on the retort-house, for the erection of 40 retorts, set on the regenerative system, capable of producing 500,000 cubic feet of gas per day. The production of coke for sale with the ordinary settings is from 7½ to 8 cwt. per ton of coal carbonized; but with the new settings it is expected to be from 10 to 11 cwt. It is also anticipated that 500 cubic feet more gas per ton of coal will be secured. The Chairman of the Committee (Alderman Travis), in moving the adoption of the minutes containing the resolution to sanction the above-named expenditure, stated that there had been a net increase in the quantity of gas sold in the quarter ending the 31st of December of 7½ million cubic feet, or rather more than 5 per cent.; and it was very gratifying to know that the increase was continuing. Referring to the principal item on the minutes—the resolution relating to the proposed expenditure on the retort-house—he said the retorts in the present house would furnish an output of 1½ million cubic feet of gas per day; and the part which would be added would certainly produce not less than 500,000 cubic feet in that time. The Committee had no hesitation in saying that what they were placing before the Council would mean that they would be able to produce gas at a lower cost than they did at present. With regard to the old portion of the retort-house, it was the intention of the Committee to renew the retorts on the same principle as the new ones, as soon as they were burnt out. They proposed to charge the cost of the new building to capital; but they were hoping that they might be in a sufficiently prosperous position to renew the old parts out of revenue. It was the desire of the Committee, as far as possible, to keep the capital account down; and if they erred at all, it would be in charging to revenue rather than to capital. Alderman Dimond seconded the motion. After a few remarks by members of the Council, the minutes were passed.

The Mayor (Mr. E. Trounson, the former Chairman of the Committee) said he should like to congratulate Alderman Travis on being able to introduce the matter. It was a thing the Committee had been interested in for some years; and he thought the sanctioning of the expenditure was one of the best steps the Council had taken for some time.

METROPOLITAN WATER BOARD.

The Fortnightly Meeting of the Board was held on Friday, at the offices of the Metropolitan Asylums Board—Sir R. M. BEACHCROFT in the chair.

The first business was the consideration of the estimates; and the Finance Committee were authorized to incur expenditure to March 31 next not exceeding in the aggregate the sum of £788,904, in respect of interest on stock, redemption of debt, management of the Board's "B" stock, establishment charges, and rates and taxes. On the recommendation of the Works and Stores Committee, they were authorized to incur, to the same date, expenditure on revenue account not exceeding £161,853. The Committee also recommended that they should be empowered to incur capital expenditure not exceeding £166,098 until March 31; and in order that this recommendation might be considered, they proposed that the Standing Order should be suspended. Mr. Pickersgill opposed this, and moved, as an amendment, that the following should be substituted: "That until the next meeting of the Board the Committee be authorized to incur such expenditure on capital account as may be necessary." This was accepted by the Chairman of the Committee, and adopted as the substantive motion. The General Purposes Committee were empowered to incur expenditure not exceeding £13,810 on revenue account and £15,000 on capital account, in respect of the purchase of lands under the East London Water-Works Act, 1900.

The Finance Committee stated that on the 9th of December last they reported that a letter had been received from the Westminster City Council, urging the desirability of having the water-rates levied by precept upon the Local Authorities, and collected with other rates. They had now to report the receipt of a further letter, dated Jan. 27, explaining that it was not the intention of the Council to

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WINDSOR ST. WORKS, BIRMINGHAM	2,000,000	KINGSTON, PA.	125,000	STRETFORD	500,000
SALTLEY WORKS, BIRMINGHAM	2,000,000	PETERBOROUGH, ONT.	250,000	OLDBURY	300,000
COLCHESTER	300,000	WILKESBARRE, PA.	750,000	TODMORDEN	500,000
BIRKENHEAD	2,250,000	ST. CATHERINES (2nd Cont.)	250,000	SALTLEY, BIRMINGHAM (Third Contract)	2,000,000
SWINDON (New Swindon Gas Co.)	120,000	BUFFALO, N.Y.	2,000,000	YORK (Second Contract)	750,000
SALTLEY, BIRMINGHAM (Second Contract)	2,000,000	WINNIPEG, MAN.	500,000	ROCHESTER (Second Contract)	500,000
WINDSOR ST., BIRMINGHAM (Second Contract)	2,000,000	COLCHESTER (Second Contract)	300,000	NEWPORT (MON.)	250,000
HALIFAX	1,000,000	YORK	750,000	TOKIO, JAPAN	1,000,000
TORONTO	250,000	ROCHESTER	500,000	PERNAMBUCO (Brazil)	125,000
OTTAWA	250,000	KINGSTON, ONT.	300,000	MALTON	150,000
LINDSAY (Remodelled)	125,000	CRYSTAL PALACE DISTRICT	2,000,000	DULUTH, MINN. (2nd Cont.)	300,000
MONTREAL	500,000	DULUTH, MINN.	300,000	BROCKVILLE (ONT.)	250,000
TORONTO (Second Contract Remodelled)	2,000,000	CATERHAM	150,000	SMETHWICK	500,000
BELLEVILLE	250,000	LEICESTER	2,000,000	GRAVESEND	300,000
OTTAWA (Second Contract)	250,000	ENSCHEDE (HOLLAND)	150,000	NEWPORT MON. (Second Contract)	250,000
BRANTFORD (Remodelled)	200,000	BUENOS AYRES (RIVER PLATE CO.)	700,000	TORONTO (Third Contract)	750,000
		BURNLEY	1,500,000	TORONTO (Fourth Contract)	1,000,000
		KINGSTON-ON-THAMES	1,750,000	MONTREAL, ONT. (2nd Cont.)	1,800,000
		ACCRINGTON	500,000	HAMILTON, ONT.	400,000

LEEDS, 1,800,000 C. Ft. LEICESTER (2nd Cont.), 1,000,000 C. Ft. NEWCASTLE-ON-TYNE, 1,800,000 C. Ft.

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propose for the Board to make precepts for lump sums, but that a statement of the water charges due in respect of each of the premises comprised within the respective districts should be furnished by the Board to each authority, who would collect the charges, together with the local rates, and account for them. The Committee understood that the Council communicated their views to the other authorities in the Board's area; but up to the present time only five of them, other than the Council, had expressed any opinion on the question, with the result that two concurred with the views put forward while the three others dissented from them. The Committee said the whole question would be considered in due course in relation to the provisions of the Metropolis Water Act, 1902, which affected it, and the authorities referred to had been so informed. The Committee also reported that the District Auditor had completed his audit of the accounts of the Board for the year ended March 31, 1904. A statement of the receipts and expenditure showed that the total receipts (temporary advances under the Metropolis Water Act, 1902) amounted to £145,000, while the total expenditure was £137,911, leaving a balance at the end of the year of £7089.

The Finance Committee also mentioned that at the meeting of the Board on the 9th of December they reported that they had given instructions for the rebate of 5 per cent. in the West Middlesex district to be discontinued as from Christmas Day, 1904, and for application to be made for the ensuing quarter's water-rate on the basis of the charges authorized by the West Middlesex Water Act, 1852; and the Board then approved their action. A number of letters had been received from Local Authorities and other consumers, protesting against the discontinuance of the rebate; and the Committee understood that it was probable that proceedings would be taken to test the legality of the Board's action. The Board would no doubt desire to give every facility for obtaining a judicial decision on a point of such great importance. They were of opinion that the question should be tested without delay; and they therefore recommended that it should be referred to the Law and Parliamentary Committee to take such steps as might appear to them to be expedient in order to facilitate an early decision on the legality or otherwise of the discontinuance of the rebate. The recommendation was agreed to.

The Works and Stores Committee presented a report in which they stated that the Chief Engineer (Mr. W. B. Bryan, M.Inst.C.E.) had submitted to them a scheme which provided for an interchange of water between the Southwark and Vauxhall and Lambeth districts, whereby a better pressure could be given to the higher areas of these districts and a very great economy of pumping and other expenses effected. The scheme had the advantage, moreover, of being a part of a larger one by which the two districts in question could be worked together with greater benefit to the public. To carry out the suggestion would necessitate the making of certain connections and the laying of various lengths of main, together with alterations to engines at some of the stations. When these were effected, a better and more economical supply of water could be afforded to the districts in question. The works now proposed were estimated to cost £30,630; and in order that the scheme might be available for supplying the districts in question during the summer months, when the draughts upon the mains were abnormal, they were of the opinion that it was absolutely necessary that they should be begun without any delay and vigorously proceeded with, so that they might be quite completed by the end of May of the present year. By this means a thoroughly efficient supply would be provided, and considerable advantage effected, in the districts in question; and, moreover, in the event of the Board approving the larger scheme which was at present under consideration for the improvement of the supply throughout the whole of the Lambeth district, the works proposed would be utilized as part of it. The Committee had given very careful consideration to the question, and now recommended—"That the estimate of £30,630 to be submitted by the Finance Committee in respect of certain works necessary for the improvement of the supply to the Lambeth district be approved as an estimate of costs, debts, or liability under section 20 (3) of the Metropolis Water Act, 1902; and that the Works and Stores Committee be authorized to incur expenditure not exceeding that amount for the purposes aforesaid." The Finance Committee submitted the estimate referred to as chargeable to capital account, and recommended that application should be made to the Local Government Board for their consent to the borrowing of the sum mentioned. The recommendations were adopted.

The General Purposes Committee reported at some length on the subject of the consolidation of the department of the Clerk of the Board, and recommended the abolition of the offices held by Mr. G. H. Gill (formerly Secretary of the Chelsea Water Company), Mr. W. Harrison (formerly Assistant-Secretary of that Company), Mr. Montague Watts (formerly Secretary of the Southwark and Vauxhall Company), Mr. H. Wilkins (formerly Secretary of the Lambeth Company), and Mr. Alexander Dickson, jun. (formerly Secretary of the Kent Company) as from the 31st prox., and the appointment on the staff of the Clerk of two officers, to be called the "estates clerk" and the "statistical clerk" respectively, from the existing staff of the Board. The recommendations were agreed to.

WATER SCHEME FOR THE CAPE PENINSULA.

According to a leading article in the "Cape Times" for the 12th ult., which a correspondent has forwarded to us, a scheme is under consideration, and will probably be shortly adopted, for affording a better supply of water to the Cape Peninsula. The following extracts from the article furnish particulars of the scheme.

When proceedings in Parliament were suspended in connection with the Water Bill brought forward last session, the Joint Water Committee decided that the interval before the next session of Parliament should

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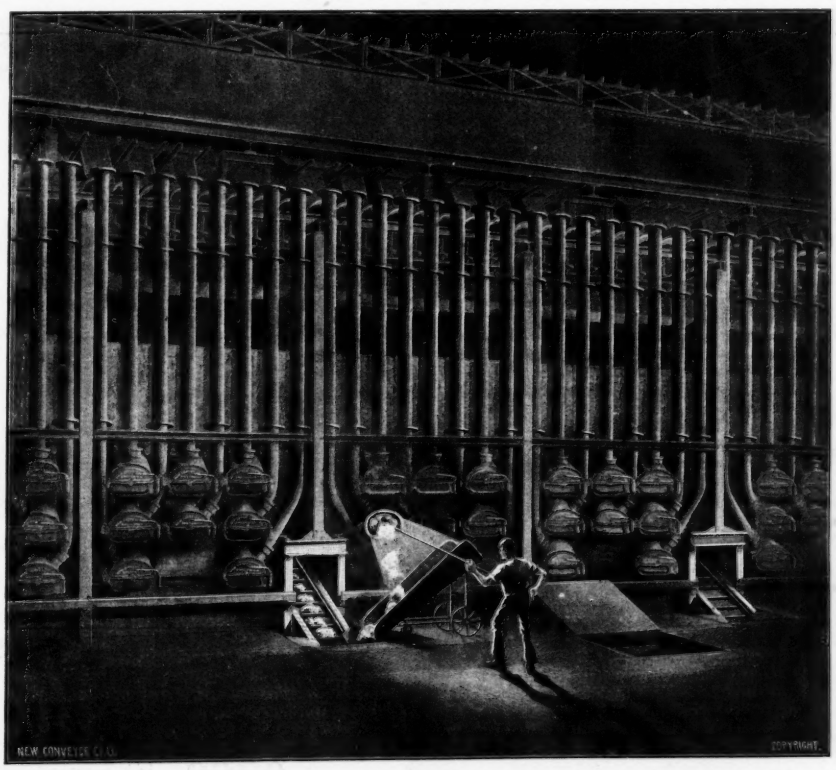

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be occupied by further investigation into the Frenchhoek scheme proposed in the Bill, and also into three others—viz., the Zacharias Hoek, Palmiet, and Steenbras River schemes. When the Councils concerned (Cape Town, Woodstock, Mowbray, Rondebosch, Claremont, and Maitland) sanctioned the expenditure, the Joint Committee appointed three engineers to conduct the inquiry. They have now presented their report. Various other water schemes were brought to the notice of the Committee during the last six months, and they were all passed over to the Engineers. The result is a report on nine schemes instead of four. The Engineers were in no way tied to any particular scheme. They were simply directed to accumulate and tabulate observed facts. Some of the schemes submitted could not be treated in comprehensive detail, and these have been merely reported upon, as requested. This mass of facts and figures has now to be submitted to an expert Water Engineer, and it will be his business to visit the various catchment areas and sites of dams, to examine the data, and criticize all the deductions and estimates based upon the data, much of which has been accumulating for nearly two years. And, finally, he has to recommend the scheme which he deems most suitable for the peninsula. The Joint Committee have been fortunate in securing the services for this purpose of Mr. Henry Rofe, M.Inst.C.E., who was engaged by the Rand Water Board to give evidence in the arbitration proceedings in which they were concerned. The most interesting page in the whole report is that which gives a summary of the particulars of the various schemes investigated and an estimated cost of each. From this summary it appears that the Frenchhoek scheme is the only one capable of supplying up to 40 million gallons of water per day. It also appears that it is possible to bring in 10 million gallons of water per day from either the Steenbras, Palmiet, or Frenchhoek sources, at an expenditure of less than £1,000,000 sterling. The ascertainment of these facts is a most important result of the further investigations; and it may be hoped that when Mr. Rofe has given his decision there will be a complete unanimity in carrying out at once the joint scheme for the peninsula.

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

For the second time in their short history, the Edinburgh and Leith Gas Commissioners are confronted with a claim of damages for the pollution of a brewery well. An action has been raised before Lord Ardwall in the Court of Session, at the instance of Messrs. James Muir and Son, Limited, of Calton Hill Brewery, Edinburgh, against the Commissioners, in which damages are sought for the pollution of the brewery well by gas oil or tar from the Edinburgh Gas-Works. The action was brought into Court yesterday. The subject is one which has been occupying the attention of the Commissioners for several months, with a view to an arrangement; but this has fallen through. In the last action, decided in November, 1890, the Commissioners were found liable in £200; but this sum by no means represented the cost to the Commissioners, which in such cases lies in the heavy fees paid to witnesses and Counsel, and in outlays upon remedial measures.

It is reported that, in view of the continued decrease in the consumption of gas, together with the largely increased producing capacity of the works, the Broughty Ferry Gas Commissioners have had under consideration the desirability of readjusting the commercial terms and conditions at present in force in the gas-stove department, and that a Sub-Committee are to submit a scheme.

The notion underlying the ancient doctrine that men do not gather figs of thistles has been well exemplified by what has taken place in Dundee in connection with the pension scheme of the Corporation. One of these uncompanionable plants has been fostered by, among others, that sturdy body of unflinching reformers known as the Gas Workers and General Labourers' Union; and it has now come to fruition. It took the form of an agitation against the granting of a pension to a retired Police Treasurer. The sum granted was £250 a year; and the objection to it was that it was a pampering of a highly-paid official at the expense of the general body of the ratepayers. The Corporation took the opinion of Counsel upon the subject, and were informed that the granting of pensions, unless they were duly provided for by statute, was illegal. This opinion the Town Council considered this week; but before the meeting of the Town Council, a meeting of the Finance Committee was held, at which it was reported that the effect of the opinion would be to cut down the pensions hitherto payable from £1022 to £208. One effect of this is to deprive a number of old employees in the Gas Department of the allowances granted them on their becoming unfit for service. The Town Council were powerless to do anything else than to stop these as well as the pension of £250. The consolation is offered of such light work as the men may be able to perform; but the poor men will in future have to work for what they get.

At the meeting of the Arbroath Town Council on Monday, the Gas Manager (Mr. A. C. Young) submitted a classified statement of the tenders for the extension of the retort-bench. The Gas Committee recommended that the building in of the retorts, the brickwork, and the fixing of the iron mountings should be undertaken by their own workmen, under the supervision of the Manager; that the general iron work should be let to Messrs. Henry Balfour and Company, Limited, of Leven, at the price of £434; and that the building of the foundations and subway walls should be let to Mr. Alex. Reid, of Arbroath, at £102. These recommendations were agreed to.

A fortnight ago, the beautiful mansion house, known as "The Glen," in Peeblesshire, belonging to Sir Charles Tennant, was almost totally destroyed by fire; the loss including not merely the mansion itself, but many valuable works of art. It was the place to which the Waverley Association held their excursion on the occasion of their meeting at Innerleithen, in April, 1901. The house was lighted by a

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private installation of electricity; and the surmise was made that the fire was originated by the fusing of an electric light wire, though some were of opinion that, in view of the fittings having been new and up-to-date, it was an unlikely theory of the cause of the fire. Another fire occurred in the head office of the North British and Mercantile Insurance Company, at 64, Princes Street, Edinburgh, also stated to have been caused by the fusing of an electric wire. It was a small affair compared with the other—only two rooms having been burned out.

The Town Council of Grangemouth have been in communication with the Gas Company upon the subject of extending the lighting season, which is at present from September to March, to the period from August to April, inclusive. The system of lighting is an all-night one. They have just agreed to the Company's terms for the lighting during April this year, which are a charge, additional, of 2s. 6d. each for lamps consuming 3 cubic feet of gas per hour, and of 3s. 4d. each for lamps consuming 4 cubic feet per hour. As to the extended season in the future, they have asked the Company to quote their terms for periods of two, three, and four years, on the footing that there are to be no meters. In the Council meeting on Monday, the Convener of the Lighting Committee said they were satisfied with the lighting, but not with the cost. They would report further upon the matter. The burgh inspector was instructed to make experiments with incandescent gas-lights in the present lamp-globes, and to report.

A serious state of matters is reported with regard to the water supply of Kirkcaldy. At Ballo reservoir, mud had got into the valves, which could not, in consequence, be closed, the rods twisting and bending whenever an attempt was made. The result was that the water escaped, and large quantities of mud were swept down the stream, causing great mischief to the mills upon it. It was necessary to stop work at one bleachfield, and there was a talk of interdict being taken out by the millowners against the Water Commission. This has been averted in the meantime, the Commission having, at a special meeting last night, agreed to send men to clear out the mud. It may be difficult, unless copious rain falls, to keep up the water supply. The Commissioners are beginning to have fears of the same result happening in the case of their new Holl reservoir, which was constructed not long ago at a cost of about £100,000. It was constructed without a bye-wash; and mud is, in consequence, being swept into it. To construct a bye-wash now would, it is estimated, cost from £15,000 to £20,000. A Committee has been appointed to consider the position of matters there.

In Arbroath, notwithstanding the shutting off of the water during the night, the town supply has gone down to a deplorable condition. Mr. Robertson, the Convener of the Water Committee, informed the Town Council on Monday that there was only 8 feet of water in the well. For the purpose of obtaining a temporary augmentation of 20,000 gallons per day, negotiations had been entered into for a supply from the private well belonging to Hospitalfield House. The Trustees upon the estate, it was reported, had acted very generously in offering to give the water at a nominal rate, the Corporation to lay the connecting pipe. This was agreed to by the Council. At the same meeting two contracts for the laying of pipes in connection with the new supply of water from the Noran stream were let, one at the price of £9595, and the other at the price of £7567. It is a condition of the contracts that the pipes be taken from Messrs. Macfarlane, Strang, and Co., Limited, of Glasgow. A site for a gathering reservoir has not yet been secured; but the Council are in negotiation with Mr. Williamson, of Glenogil, on the subject.

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *Feb.* 18.

Sulphate of Ammonia.

A quiet tone has pervaded the market throughout the week, and prices have barely been maintained, for while the large makers, being for the most part fully sold in advance, have maintained a firm attitude, the smaller makes have been offered more freely. Buyers, on their part, have been hanging back in the hope of bringing about a further decline. Consequently the closing quotations are £13 to £13 2s. 6d. per ton f.o.b. Hull, £13 3s. 9d. per ton f.o.b. Liverpool, and £13 6s. 3d. per ton f.o.b. Leith. The forward position has been neglected, buyers not seeing their way to paying the premium demanded for delivery over the spring months, and July-December being too far ahead to attract attention.

Nitrate of Soda.

Although this article is rather easier at some of the Continental ports, owing to heavy arrivals, local prices remain 11s. 3d. to 11s. 6d. per cwt., according to quality, for prompt and spring delivery.

LONDON, *Feb.* 18.

Tar Products.

Markets continue quiet; and there is very little business doing. Benzol is, if anything, a trifle easier; and it is reported that there are now sellers of 90 per cent. at 10d. per gallon f.o.b. London. The market in the North of England is decidedly quiet, and sales are reported at 9d. per gallon in one or two instances. In 50-90 per cent. there has been a little business doing for home consumption; but prices rule very low. There is nothing fresh to advise in toluol and solvent. These articles do not seem to interest consumers just at present. In creosote, business continues fairly good in Yorkshire. The price does not, however, improve, 1¼d. having again been accepted; but the largest makers still hold out for 1⅜d. In the Manchester district, sales have been made at 1 3/10d. for February-March; and at this price there are still sellers. As regards London, the market appears to be better; and there is rather more inquiry from America. There are no longer sellers at 1⅜d.; makers asking 1½d., and in some instances 1⅜d., for early delivery. There is no real business doing in anthracene; but inquiries continue to come in from the Continent, especially for forward delivery. Manufacturers here are still quite determined not to offer unless at very much higher prices than those at

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present ruling—preferring to abandon making the article rather than accept contracts at under 2¼d. to 2½d. per unit. Carbolic acid continues dull, and sales are reported at 1s. 10d. and 1s. 11d. for 60's, although it is not easy to find sellers of any quantity at these quotations. Consumers, however, seem to be quite determined not to purchase for forward delivery except at their own ideas of value; and probably manufacturers may have to give way a little in price if they wish to effect sales. In crystals, there is a good deal of inquiry; but prices still remain very quiet, and there are second-hand parcels offering at certainly under the prices which makers are willing to accept. In pitch, a London maker has realized 36s. net for a large quantity. Stocks in London are very low; and the half-year's make is practically all sold. The inquiry from South Wales is scarcely so good as was the case a week ago, some of the consumers having evidently filled up their requirements for the time being. There are, however, inquiries for delivery over the last six months of the year; but consumers' ideas of value do not tempt either dealers or makers to contract so far forward. In Belgium, there is really nothing whatever doing, and consumers decline to purchase until the labour questions are definitely settled. It is reported, however, that there are several inquiries in the market for delivery over the last eight and nine months of the year. Consumers' ideas of value are, however, considerably under those of dealers. In the Lancashire district, there has been a little business doing for early delivery; but makers are not prepared to accept the prices offered by dealers for March-April shipment.

The average values during the week were: Tar, 18s. to 22s. 6d. Pitch, London, 34s. to 34s. 6d.; east coast, 32s. 6d.; west coast, 31s. to 31s. 6d. **Benzol, 90 per cent.**, 9¾d. to 10d.; **50-90 per cent.**, 8d. **Toluol**, 7⅞d. **Crude naphtha**, 3d.; **solvent naphtha**, 8½d.; **heavy naphtha**, 9½d. to 10d. **Creosote, London**, 1⅞d. to 1¾d.; **North**, 1¼d. **Heavy oils**, 2d. to 2⅛d. **Carbolic acid, 60 per cent.**, 1s. 10½d. to 1s. 11d. **Refined naphthalene**, £4 to £8; **salts**, 17s. 6d. to 20s. **Anthracene**, "A" quality, 1⅝d. to 1¾d.; "B" quality unsaleable.

Sulphate of Ammonia.

There has been very little doing during the past week; and the market closes with rather a quieter tone. The Gaslight and Coke Company's price still remains £13 10s.; and they do not seem at all prepared to reduce it. The South Metropolitan Company are still asking £13 15s. on their own terms, but have not been able to realize this price. They do not, however, appear at all anxious to sell, and show no signs at present of reducing their quotation. In Leith, slightly lower prices are reported to have been accepted for prompt delivery; but there is really very little business doing. There is no business of importance to report in Hull. Buyers will not pay more than £13 5s. for early shipment, and do not seem anxious to purchase even at this; while makers at present decline to quote forward.

COAL TRADE REPORTS.

Lancashire Coal Trade.

There is no change to report in the general condition of the coal trade in this county. The generally improved state of the cotton, iron, and building trades, allied with the brisk demand for coal from foreign nations, keeps up prices to the full quotations given last week. Cannel, too, is going out well. House coal is in moderate request. The winter has been long, but not particularly severe, and requirements have never been abnormal. Engine fuel finds the readiest market, even at the rise in price. Slack is more likely to become dearer than cheaper for a long time to come, because of the sluggish output of coal for domestic purposes. As the warmer weather comes nearer, this output will be still less, and slack of best quality will be harder to obtain. Contractors for slack, however, whose agreements extend into the summer, will have to be supplied, even if colliery owners have to make it out of material which they would rather not be compelled to put to such requirements. Coal for shipping at the docks and along the Canal is in satisfactory demand. There have, indeed, been more inquiries for shipping coal lately; so that, on the whole, the coal trade of Manchester and Lancashire is in a healthy condition. With regard to slack in Derbyshire, much of it is known to be less valuable than that from Lancashire pits, and can be had for lower prices than those ruling in the latter county. Coke is hardening, as it generally does when iron is in good demand.

Northern Coal Trade.

The coal trade is naturally quieter now that the abnormal demand for the Continent has ceased; but for the time of year there is a fair demand generally. In the steam coal trade, there is a lower range of prices, similar to those known before the strikes. Best Northumberland steams are 9s. to 9s. 3d. per ton f.o.b., second-class steams about 8s., and steam smalls 5s. to 5s. 3d. The work at the collieries is not quite so full. In the Durham coal trade, there is a lessened demand also; but still the output is tolerably well taken up. In gas coals, there is a good demand, but not quite so full as it was. Prices show a rather wider range; Durham gas coals varying from about 8s. to 8s. 9d. per ton f.o.b. for occasional cargoes. There are several contracts now in the market, both for Swedish and for Italian ports; and it seems to be expected that the basis of prices will be from 8s. to 8s. 6d. per ton for good gas coals. In coke, there is little alteration; but the output is less, and this must be expected in time to stiffen the price.

Scotch Coal Trade.

Trade has suffered a slight check, consequent upon the settlement of the German coal strike; but it may be only temporary, as trade generally is looking up slightly. There are very large supplies, particularly of ell. Splint continues in fair request. The prices quoted are: Main 7s.6d. to 7s. 9d. per ton f.o.b. Glasgow, ell 8s. 3d. to 9s. 3d., and splint 8s. 9d. to 9s. The shipments for the week amounted to 265,829 tons—an increase of 14,783 tons upon the previous week, and of 101,560 tons upon the corresponding week of last year. For the year to date, the total shipments have been 1,214,419 tons, an increase of 187,357 tons upon the corresponding period of 1904.

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Water-Gas Plant Facilitates the Abolition of Sunday Labour.—In the course of a letter just received from Mr. W. Arnott, the Manager at Port Elizabeth of the South African Lighting Association, Limited, he says that he has had an installation of Humphreys and Glasgow carburetted water-gas plant at work for six months, and it has enabled him to abolish Sunday labour in the retort-house.

Dorchester Gas-Fitting Company, Limited.—At the annual meeting of this Company last Tuesday, the accounts presented showed a gross profit of £91, and a net profit of £62. The latter was added to the appropriation account, bringing it up to £224. There was a balance of £181 13s. on this account at the end of the year; and the Directors recommended a dividend of 6d. per share, carrying forward the balance (£139).

Decline of Strikes Last Year.—The numbers of disputes, workpeople affected, and working days lost in the past year were all the smallest on record. According to an official return in the "Labour Gazette," only one in every hundred of the industrial population had any trouble with his or her employers. In all there were 334 disputes, affecting 83,922 workpeople, and lasting in the aggregate 1,416,265 working days, or an average of rather less than 17 days per striker.

Barnet District Gas and Water Company.—At the half-yearly meeting of the Company next Friday, the Directors will report a further satisfactory increase in both the gas and water departments. The balance standing to the credit of the profit and loss account is £30,427, out of which they recommend the declaration of a dividend, less income-tax, at the rate of 7½ per cent. per annum on the "A" and "C" stocks, of 6½ per cent. per annum on the "B" stock, and of 5¼ per cent. per annum on the "D" capital gas and water stocks.

Opposition to the Hayling Island Gas Order.—The ratepayers at North Hayling have shown decisive opposition, at a special parish meeting, to the Provisional Order which has been applied for by the Hayling Island Gas Company, to invest them with power to lay mains and supply gas. Mr. Kelly was Chairman of the meeting, but failed to obtain a seconder to his resolution in favour of approving the Draft Order. Mr. Kepplewhite thereupon proposed another resolution—"That we do not want the gas, nor approve of the Order, and do not wish our roads torn up to lay the mains." This was carried; the only dissentient being the Chairman.

Tuscan Gas Company and Electric Lighting at Civita Vecchia.—Judgment in an important action brought by the Tuscan Gas Company against the communal authorities of Civita Vecchia has lately been made public. According to a recent number of "L' Elettricita," it has been decided that the authorities failed to fulfil their obligations to the Company, in accordance with the contract of April 14, 1869, by allowing cables to be laid in the public thoroughfares to supply private consumers and the theatre with electric light before obtaining authority from the Prefect to do so, and permitting the Viale Garibaldi and the Piazze Vittorio Emanuele, Cavour, and Plebiscito to be lighted by electricity. The authorities have been ordered to pay the Company damages, and four-fifths of their costs.

Suicides by Gas Poisoning.—The strange way in which a curate committed suicide was described at an inquest on the Rev. Huyshe Melhuish Cathcart Worthy, at Gillingham, Kent, on Thursday. After finishing a novel, he turned on a gas-tap connected with the stove in his bedroom, and placed his mouth over the pipe from which the gas was escaping. He enveloped his head in a blanket, so as to inhale all the gas. The window was closed, and a cassock was inserted in the flue of the chimney. A Jury at Thornton Heath last Thursday returned a verdict of "Suicide while of unsound mind" in the case of a married woman named Emily Jane Escare, who was found dead in her bedroom with the door locked and a piece of india-rubber tubing near her. The window was open, and no leakage of gas could be traced other than from the tap, which the husband said he found turned on when he first discovered his wife in the room.

Sedgley Gas-Works Extension.—Last Saturday week, at the invitation of the Chairman of the Sedgley Urban District Council (Mr. J. T. Tennant, J.P.), a number of members and officers assembled at the gas-works, Lower Gornal, to inspect some of the recent additions. The Chairman explained that the works were purchased from a Company in 1883 by the Sedgley Local Board. The first record of the make of gas was from June 23, 1884, to March 25, 1885—8,980,900 cubic feet. The following year it was increased to 11,910,700 cubic feet, and last year it was 24,806,500 feet. The plant was out of date; and the Gas Committee commenced to procure modern apparatus. Four years ago they built new offices at a cost of £400; and two years ago they laid down four new purifiers (Milbourne's patent), equal to 150,000 cubic feet per day, to replace the three old ones. They also purchased new boilers, meters, engines, &c., until the present plant made a model gas-works.

Decreased Sale of Gas at Walsall.—In presenting the annual report of the Gas Committee, at last week's meeting of the Walsall Town Council, Alderman T. P. Brownhill said that a profit of £5634 had been made on a decreasing trade, which was quite a new experience in relation to the gas undertaking. The causes he believed to be bad trade, the extension of incandescent lighting, and the increased use of electricity. There had been about 4 million cubic feet less gas sold, but some 10 million feet less had been made, which showed that 6 millions had been saved, representing about £700. As to the sources of profit, an economy of £2500 had been effected by a reduction in the price of coal, and £1932 less had been spent on repairs and maintenance of works. There had been a small diminution in the receipts from sales of residuals, and £324 more had been paid in rates and taxes, the total of which was no less than £3707. The Committee had been warned by the Town Clerk that they must be careful as to their capital expenditure; and all they had spent had been £3600, while they had repaid £2800. The outlook for the future was very satisfactory. Of the profit, £5000 would be available for the relief of the rates. If next year the Electrical Committee came forward with a profit of £1000, the trams with £2000, and the gas undertaking with another £5000. then they would once more make Walsall an attraction to those outside by reason of the lowness of its rates.

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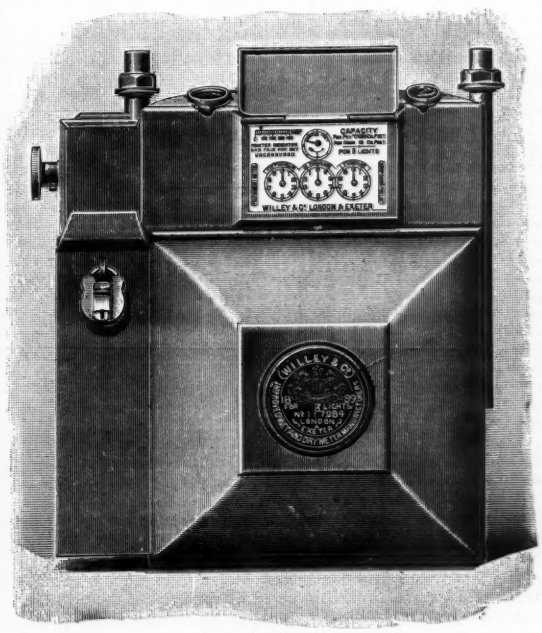

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The Typhoid Epidemic at Lincoln.—Up to last Thursday, the total number of cases of typhoid fever notified at Lincoln was 636, and the number of deaths from the disease 40. A meeting of the Council in committee was held on Wednesday, when the opinion was expressed that an early supply of pure water, in addition to that expected from the present bore, was eminently desirable. A Committee was formed, with instructions to make such inquiries and retain such expert assistance as they thought fit, and to report thereon to the Council as soon as possible. The Newark authorities have undertaken to supply the city with 5000 gallons of water daily for a month.

Explosion at Formby Gas-Works.—About four o'clock in the afternoon of yesterday week, an explosion occurred at the Formby Gas-Works. It appears that men in the employ of the Company were at work cleaning the boilers previous to an inspection for insurance purposes; and while Mr. J. H. Buckley was in the boiler, one of the men noticed the bad state of a pipe leading into it. Mr. Buckley struck a match to examine the pipe, and an explosion immediately followed, which is supposed to have been caused by the residue of the gas in the horizontal pipe. Mr. Buckley was badly burnt about the face; and the man who pointed out the condition of the pipe was also scorched. Mr. Buckley was removed to his home in a rather serious condition; but he he has since slightly improved.

Municipal Trading in Gas-Fittings.—At a recent special meeting of the Clacton Urban District Council, a letter was read from the Clacton Traders' Association protesting against the Council's proposals to enter into municipal trading by supplying and maintaining gas-fittings, &c. Mr. James proposed that the resolution passed by the Council last December to supply gas-fittings on the hire-purchase system, and maintain consumers' burners, &c., be rescinded. He thought the Council had sufficient on their hands already. Mr. S. H. Green (the Chairman of the Gas and Water Committee) said the local traders did not take up the class of business proposed by the Council, and were apparently unwilling to do so. The Council's only object was to increase the consumption of gas. Mr. T. H. Baker did not think the Council would be acting in the interests of the ratepayers if they allowed this remunerative field of business to remain undeveloped any longer. Mr. James said the traders felt that this was the "thin end of the wedge" in regard to municipal trading. They might as well set up as coal merchants, and import a few architects and surveyors. The motion was lost—three voting for and six against it.

Serious Condition of the Shrewsbury Water Supply.—At the quarterly meeting of the Shrewsbury Town Council on Monday last week, Alderman S. M. Morris commented on a serious breakdown which had occurred in the supply of drinking water in the borough the preceding Saturday and Sunday, necessitating a large number of the inhabitants using the unfiltered and condemned water from the Severn, and said a great effort was being made to convey water to the different districts in carts. In view of the deplorable state of affairs at Lincoln, consequent upon the lack of an adequate water supply, and of the uncertainty at all times of this occurring at Shrewsbury, Mr. Woodhouse urged the Council to make a definite move in securing for the borough a more satisfactory water scheme. They must not allow to continue to exist the possibility of the town finding itself in a position similar to that of Lincoln. Alderman Horn, remarking on the futile efforts the Council had made to carry out a scheme, argued that the responsibility had been taken off their shoulders by the action of the Local Government Board, who had defeated their aims. Mr. Bromley considered the ratepayers themselves, who had opposed the Council, were to blame, though he did not think they realized that the water supply of the borough was in the dangerous condition it had undoubtedly been for a long time. Mr. Morris observed that the deputation appointed some time ago to wait upon the Local Government Board to consider the question of the water supply to the borough had done so. Their report was not yet completed; but, if they could not have an upland supply, they must do whatever was possible to make the river water suitable for drinking purposes.

The Mountain Ash Urban District Council have resolved, by eight votes to six, that a proposal to introduce prepayment meters be not proceeded with.

It is reported that Messrs. Speyer Bros. have bought £3,400,000 Rand Water Board 4 per cent. inscribed stock, and that the issue will be made shortly.

The Richmond Gas Stove and Meter Company, Limited, have recently held successful exhibitions in South Shields, Sunderland, and, in conjunction with the Gas Company, at Wellingborough.

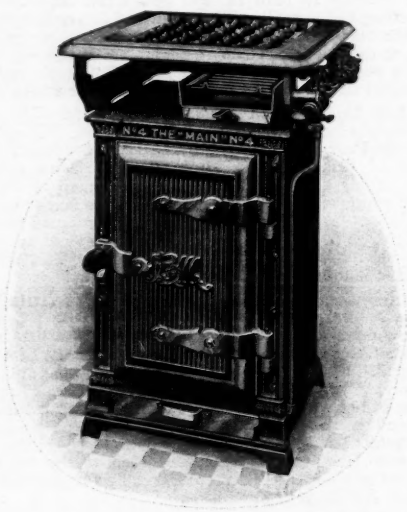
It is understood that the Board of Trade have formally sanctioned the Formby Gas Order, by which increased borrowing powers are being sought, and also authority for the extension of the mains and for the supply of gas in bulk to local authorities.

The Chemical Engineering Company and Wilton's Patent Furnace Company have obtained an order for sulphate of ammonia plant in connection with a large battery of coke-ovens at the Manvers Main Colliery Company, Limited; also orders from the Perth Corporation for the supply to their gas-works of a patent ammonia liquor still and lime-pumps, and from Mr. H. Ellison, of Cleckheaton, for a similar still and pump. They have, in addition, received an order for one of their patent closed saturators for Messrs. Van Der Elst and Matthes, of Amsterdam.

Alderman Thomas Canning, J.P., the Engineer and Manager of the Newport (Mon.) Gas Company, presided at the annual dinner of the members of the Gas-Works Benefit Society on Monday evening last week. The toast of the evening—"Success to the Gas-Works Benefit Society"—was proposed by Mr. T. H. Hazell, the Secretary of the Company, and acknowledged by Mr. J. Whitefield, the Secretary of the Society, who read the report, which showed that the receipts and donations amounted to £367—£24 19s. being from the Chairman and Directors—and £127 was granted for sick pay. A sum of about £36 had been contributed to the Newport and Monmouthshire Hospital, representing the weekly subscriptions of the members; and they had a balance of £145, compared with £93 17s. last year.

The "MAIN"

Gas Cooker



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The Rothwell Urban District Council have decided to spend a sum of £1800 upon an extension of the gas-works. The alterations are in accordance with the recommendations of Mr. Eunson, and include the erection of a new retort-house and the provison of additional storage capacity.

To the various devices for attracting business on the prepayment system, there is no end. The latest to come under our notice is a card (8½ in. by 6 in.) sent out by the Winchester Water and Gas Company, setting forth what they are prepared to provide and fix free for new consumers. A penny-in-the-slot meter, cooker, boiling-ring, pendant and bracket fitted with incandescent burners, and a bracket with a flat-flame burner, are shown in a group; and a very good representation of the coin by means of which these appliances can be brought into use to brighten the home and add to domestic comfort is stamped on one corner of the card.

The Public Libraries Committee reported to the Camberwell Borough Council last Wednesday that the lighting of the Livesey Library had been in a bad condition for some time. The South Metropolitan Gas Company having been communicated with, they generously undertook to relight the library free of cost. The alterations, which were now completed, were a great improvement. It was resolved to tender the thanks of the Council to the Company for their action.

On the occasion of the recent annual meeting of the Shanklin Gas Company, when dividends of 10 and 7 per cent. were declared, the usual entertainment provided for the employees took place in the new Board room, and served as the inauguration of the premises. The Engineer and Secretary (Mr. Frank C. Taylor) presided, and several of the Directors were present. The after-dinner proceedings were of a most pleasant character; vocal and instrumental music being contributed by Mrs. and the Misses Taylor and a number of the company.

WANTED, FOR SALE, CONTRACT, &c., ADVERTISEMENTS IN THIS WEEK'S "JOURNAL."

Situations Vacant.

SECRETARY AND MANAGER. Chippenham Gas-Works.
MANAGER. Isle of Thanet Gas Company. Applications by March 2.
BOOK-KEEPER. No. 4345.
WORKS FOREMAN. Birmingham Gas Department.
WORKS FOREMAN. Merthyr Tydfil Gas-Works.
FOREMAN FITTER AND INSPECTOR. Winchester Water and Gas Company.
ENGINE FITTER. Albion Gas-Works.

Situations Wanted.

SLOT-METER COLLECTOR OR INSPECTOR. No. 4344.
GAS ENGINEER. No. 4329.
METER INSPECTOR. No. 4330.
REPRESENTATIVE OF MANUFACTURING FIRM. No. 4342.

Agency Wanted by Engine Builders. No. 4335.

Plant Wanted (Second-Hand).

SCRUBBER (or WASHER SCRUBBER) AND CONDENSER. North Ormesby Gas Company. Offers by March 6.

Plant, &c., for Sale.

CAST IRON PLATES FOR SCRUBBERS. No. 4338.
DRAWING AND PATTERNS, &c. No. 4343.
GASHOLDER AND TANK, CONDENSERS, WASHER, PURIFIERS, &c. Gourock Gas Department.

Gas-Works (complete) for Disposal.

Particulars of Messrs. Balls, Castle Hedingham.

Company Meeting.

HARROW AND STANMORE GAS COMPANY. Albion Tavern, March 6. Twelve o'clock.

Loans on Mortgage. Derwent Valley Water Board.

Stocks and Shares.

ASCOT GAS COMPANY. March 7.
CARDIFF GASLIGHT AND COKE COMPANY. March 7.
NEWCASTLE AND GATESHEAD GAS COMPANY. Feb. 27.
SOUTHEND GAS COMPANY. March 7.
WOKING GAS COMPANY. March 7.

TENDERS FOR

Coal and Cannel.

MIDDLETON CORPORATION. Tenders by March 4.

Engine, &c.

BROADSTAIRS AND ST. PETER'S U.D.C. Tenders by March 11.

Fire-Clay Goods (*see also* **Retort Benches**).

TYLDESLEY-WITH-SHAKERLEY GAS DEPARTMENT. Tenders by March 2.

Gasholder.

THAMES VALLEY AND GORING WATER AND GAS COMPANY. Tenders by March 9.

Oil for Gas Making.

CARLISLE GAS DEPARTMENT. Tenders by Feb. 28.

Oxide of Iron.

CARLISLE GAS DEPARTMENT. Tenders by Feb. 28.

Retort Benches, &c.

NORTH ORMESBY GAS COMPANY. Tenders by March 6.
PORTADOWN GASLIGHT COMPANY. Tenders by March 1.

Retort House.

NORTH ORMESBY GAS COMPANY. Tenders by March 6.

Scrubber (or Washer-Scrubber).

NORTH ORMESBY GAS COMPANY. Tenders by March 6.

Tank.

THAMES VALLEY AND GORING WATER AND GAS COMPANY. Tenders by March 9.

Tar (Coal and Water Gas).

CARLISLE GAS DEPARTMENT. Tenders by Feb. 28.

Well Sinking.

SELBY URBAN DISTRICT COUNCIL. Tenders by March 10.

NOTICES TO CORRESPONDENTS, ADVERTISERS, AND SUBSCRIBERS.

No notice can be taken of anonymous communications. Whatever is intended for insertion in the "JOURNAL" must be authenticated by the name and address of the writer; not necessarily for publication, but as a proof of good faith.

COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office NOT LATER than TWELVE O'CLOCK NOON ON MONDAY, to ensure insertion in the following day's issue.

Orders for Alterations in, or stoppages of, PERMANENT ADVERTISEMENTS should be received by the FIRST POST on SATURDAY.

Wanted, For Sale, and Tender Advertisements, Six Lines and under, 3s.; each additional Line, 6d.

TERMS OF SUBSCRIPTION to the "JOURNAL."

United Kingdom: One Year, 21s.; Half Year, 10s. 6d.; Quarter, 6s. 6d.
Payable in Advance. If credit is taken, the charge is 25s. a year.

Abroad (in the Postal Union): £1 7s. 6d., payable in Advance.

All Communications, Remittances, &c., to be addressed to WALTER KING, 11, BOLT COURT, FLEET STREET, LONDON, E.C.
Telegrams: "GASKING, LONDON." Telephone: P.O. 1571a Central.

OXIDE OF IRON.

O'NEILL'S OXIDE has a larger annual sale than all other Oxides combined.

SPENT OXIDE purchased in any district.

GAS PURIFICATION & CHEMICAL CO., LD.
JOHN WM. O'NEILL, Managing Director,
PALMERSTON HOUSE, LONDON, E.C.

WINKELMANN'S
"VOLCANIC" FIRE CEMENT.
Resists 4500° Fahr. Best for GAS-WORKS.
ANDREW STEPHENSON, 182, Palmerston House, Old Broad Street, London, E.C. "Volcanism, London."

SULPHURIC ACID for Sale, specially suitable for making Sulphate of Ammonia.
BROTHERTON AND CO, LTD., Chemical Manufacturers. Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

JOHN RILEY & SONS, Chemical Manu-facturers, Hapton, near Accrington, are MAKERS of Special SULPHURIC ACID, for Sulphate of Ammonia Making. Highest percentage of Sulphate of Ammonia obtained from the use of this Vitriol, which has now been used for upwards of 50 Years. References given to Gas Companies.

GAS TAR wanted.
BROTHERTON AND CO., LTD., Tar Distillers. Works: BIRMINGHAM, GLASGOW, LEEDS, LIVERPOOL, AND WAKEFIELD.

J. & J. BRADDOCK (Branch of Meters Limited), Globe Meter Works, OLDHAM, and 45 & 47, Westminster Bridge Road, LONDON, S.E.
WET AND DRY GAS-METERS, PREPAYMENT METERS, STATION METERS, AND GOVERNORS.
REPAIRS RECEIVE PROMPT ATTENTION.
Telephones: 254 Oldham, and 2412 HOP, London.
Telegrams:—
"BRADDOCK, OLDHAM," and "METRIQUE, LONDON."

DUTCH OXIDE OF IRON.

THE First Dutch Bog Ore Co., Ltd., (Eerste Hollandsche Yzererts Maaty), ROTTERDAM.
General Manager (for England and Wales)—
CHARLES E. FRY, LEAMINGTON; and at Tower Chambers, Brown Street, MANCHESTER.
London Managers—
E. PADFIELD & CO., 96-98, Leadenhall Street, LONDON, E.C.
General Manager (for Scotland)—
J. B. MACDERMOTT, 11, Bothwell St., GLASGOW.

ATTERTON'S Patent Charging Machine, especially adapted for Small Works up to 50 Millions. Nearly 40 already supplied, and still supplying. Would soon repay for small outlay. Increased make and reduction in cost.
Apply to E. PADFIELD AND CO., 96 & 98, Leadenhall Street, LONDON, E.C.

COAL GAS TAR wanted.
BEST PRICES GIVEN.
SHARPNESS CHEMICAL COMPANY, LIMITED, Sharpness Docks, GLOS.

OXIDE OF IRON.
(NATURAL.)
BALE & CHURCH will be pleased to send Quotations and Samples on application.
SPENT OXIDE PURCHASED.
BALE'S FIRE CEMENT for all Retort and Furnace work.
PAINT for Gasholders, Purifiers, &c.
5, CROOKED LANE, LONDON, E.C.

SULPHURIC ACID.

SPECIALLY prepared for the Manu-facture of SULPHATE OF AMMONIA.
SPENCER, CHAPMAN, AND MESSEL, LIMITED, 36, Mark Lane, LONDON, E.C. Works: SILVERTOWN.
Telegrams: "HYDROCHLORIC, LONDON."
Telephone: 341, AVENUE.

GAS LIQUOR WANTED.
Particulars to MAJOR AND COMPANY, LIMITED, HULL.

SPECIAL PAINT FOR GAS-WORKS.
JOHN E. WILLIAMS AND CO.,
VICTORIA PAINT WORKS,
MANCHESTER.
Telegrams: "ENAMEL." National Telephone 1759.

OXIDE OF IRON.
WESTBURY OXIDE is now being ex-tensively used for Gas Purification.
For Price and Analysis write to the NEW WESTBURY IRON COMPANY, LIMITED, WESTBURY, WILTS.

ROBERT DEMPSTER & SONS, Ltd., Contractor for Complete CARBONIZING PLANTS and every description of GAS APPARATUS and ELEVATING and CONVEYING PLANT, Rose Mount Iron-Works, Elland.

PATENTS AND TRADE MARKS PUBLICATIONS, "MERCHANDISE MARKS ACT, and Decisions thereunder," 1s.; "TRADE SECRETS v. PATENTS," 6d.; "DOCTRINE of EQUIVALENTS, Mechanical and Chemical," 6d.; SUBJECT-MATTER of PATENTS," 6d.
MEWBURN, ELLIS, & PRYOR, Chartered Patent Agents, 70 and 72, Chancery Lane, London, W.C. Telegrams: "Patent London." Telephone: No. 243 Holborn.

AMMONIACAL Liquor wanted. Brotherton and Co., Ltd., Ammonia Distillers. Works: Birmingham, Glasgow, Leeds, Liverpool, and Wakefield.

SULPHATE OF AMMONIA SATURATORS and all LEAD and TIMBER WORK in Connection with Sulphate Plants.
We guarantee promptness, with efficiency for Repairs.
Joseph Taylor and Co., Central Plumbing Works, Bolton.
Telegrams: Saturators, Bolton. Telephone 0848.

HYDRATED OXIDE OF IRON.
PREPARED from Pure Iron.
Twice as Rich as Bog Ore.
Gives no Back Pressure.
The Cheapest in the Market.
Can be Exchanged for Spent Oxide.
Read Holliday and Sons, Ltd., Huddersfield.

GASHOLDER PAINTING.
PAINTING Work for all kinds of Gas- Works Plant undertaken by contract or otherwise.
Frederick Boyall, 31, Regent's Row, Queen's Road, Dalston, N.E. Established 1850.

SPENT OXIDE.
THE South Metropolitan Gas Company are always open to receive OFFERS of SPENT OXIDE.
Chief Office: 709, Old Kent Road, London, S.E.
Telegrams: "Metrogas, London."

BIGGS, WALL, & CO., 13, Cross Street, Finsbury, E.C. *Telegrams:* "Ragout," London. *Telephone:* 273 Central.
Charging Machines—See Advt. in last week's issue.
Exhausting Machinery—See Advt. in this week's issue.
Saturators—See Advt. in next week's issue.

GLASS SHADES of every description, for all kinds of Interior **GAS LIGHTING.** Illustrated sheets on application.
JOHN WALSH WALSH,
Soho and Vesta Glass Works, BIRMINGHAM.
Telegrams: "Vesta, Birmingham."
National Telephone: No. 63.
London Show-Room: 4, Holborn Circus, E.C.

BROTHERTON & CO., LIMITED. Offices: Commercial Buildings, Leeds. Correspondence invited.

GAS TAR and AMMONIACAL LIQUOR wanted by
George Miller and Co., Tar Distillers,
40, West Nile Street, Glasgow.

GAS Engineer wishes to recommend Young Man as Meter Inspector, Collector, Timekeeper, &c. Thoroughly trustworthy. Abstainer.
Apply, by letter, to No. 4330, care of Mr. King, 11, Bolt Court, Fleet Street, E.C.

GAS Engineer, with over 20 years' Practical Experience, is prepared to accept ENGAGEMENT as Engineer, Manager, or Secretary.
Apply, by letter, to No. 4329, care of Mr. King, 11, Bolt Court, Fleet Street, E.C.

WANTED, a situation as Collector of Prepayment Meters or INSPECTOR. Has had over Six Years' practical Experience—five Years with a well-known London Gas Company. Good References.
Address No. 4344, care of Mr. King, 11, Bolt Court, Fleet Street, E.C.

GENTLEMAN, holding good official position in large Suburban Gas Company, desires to represent large Firm of Manufacturers doing business with leading Gas Companies in United Kingdom and Ireland, or British Isles.
Address, No. 4342, care of Mr. King, 11, Bolt Court, Fleet Street, E.C.

WANTED by the Winchester Water and Gas Company an Energetic and Pushing FOREMAN FITTER and INSPECTOR. Applications, which need not in the first instance be accompanied by Testimonials, to state previous Experience and Wages required; also Age and whether Married or Single. The person appointed must be of good address, must have thorough practical Knowledge of Gas and Water Fittings, and be capable of Taking Entire Charge of the Company's Fittings Department.

ENGINE Builders in the North would be glad to take AGENCY for selling any kind of Machinery to be driven by such Engines, chiefly Large and Medium sizes. A good all-round old established connection, particularly in Scotland and the North of England.
Address No. 4335, care of Mr. King, 11, Bolt Court, Fleet Street, E.C.

WANTED, a Good Engine Fitter. Preference given to one with Gas-Works Experience. Wages 36s. per week.
Applications, giving References, to be sent to the Engineer, Corporation Gas-Works, Albion, West Bromwich.

WANTED, immediately, by a large Provincial Gas Company, an experienced BOOK-KEEPER, thoroughly competent to Take Charge of the Accounts and prepare Annual Statements.
Apply, by letter, stating Age, Experience, and Salary required, to No. 4345, care of Mr. King, 11, Bolt Court, Fleet Street, E.C.

CHIPPENHAM GAS COMPANY.
A SECRETARY and Manager is re- quired for the Gas-Works at Chippenham.
Candidates must be fully qualified to undertake the Entire Management of the Works and the various duties pertaining to the Office of Secretary.
Applications, stating Age, Salary required, and giving full Particulars of Qualifications, and accompanied by *copies* of not more than Three Testimonials, to be addressed to Mr. D. Collen, Chairman of the Company, on or before Friday, Feb. 24, 1905.
Canvassing will be deemed a disqualification.

CITY OF BIRMINGHAM.
(Gas Department.)
REQUIRED, Two Works Foremen, Eight hour shifts—viz., 10 p.m. till 6 a.m, and 2 p.m. till 10 p.m., changing over fortnightly.
Applicants must have had a good Mechanical Training, be well acquainted with up-to-date Plant and Machinery, and used to controlling men. Commencing salary £130 per Annum.
References and all Particulars to be sent to the undersigned, City Gas-Works, Saltley, Birmingham, on or before Saturday, Feb. 25.
Henry Hack,
Engineer-in-Chief.

MERTHYR TYDFIL GAS COMPANY.
WANTED, a thoroughly competent WORKS FOREMAN, Experienced in the Working of Regenerative Furnaces, and capable of controlling workmen. One who has had Experience with a Carburetted Water-Gas Plant preferred.
Wages £2 per week, with Dwelling House on Works, Coal, Gas, Rates, and Water.
Applications to the undersigned on or before Monday the 27th inst., stating Age, whether Married or Single, and where last or now employed, with References as to Character and Ability.
James E. Kenshole,
General Manager.
Gas-Works, Merthyr Tydfil,
Glam., Feb. 13, 1905.

ISLE OF THANET GASLIGHT AND COKE COMPANY, MARGATE.
THE Directors of the above Company are prepared to receive APPLICATIONS for the appointment of MANAGER. The quantity of Coal Carbonized last year was 26,155 Tons.
Candidates must possess a thorough knowledge of the Manufacture and Distribution of Gas in all its branches, as also the Manufacture of Sulphate of Ammonia and the Conduct of the ordinary official Correspondence, &c.
Salary £325 per Annum, with supply of Gas.
Applications, in candidates' own handwriting, stating Age, Experience, &c., and enclosing *copies* of not more than Three recent Testimonials (which will not be returned), to be sent to these Offices, addressed to the Chairman, not later than Thursday, March 2, 1905.
Canvassing will disqualify.
By order,
Thos. C. Fuller, F.C.I.S.,
Secretary.
Company's Offices: The Dane,
Margate, Feb. 17, 1905.

NORTH ORMESBY GAS COMPANY, LIMITED.
WANTED, a Scrubber (or Washer- Scrubber) and CONDENSER for a make of a Quarter-of-a-Million Cubic Feet of Gas per day. New or second-hand.
Prices and Particulars to T. Weatherly, Secretary, on or before March 6, 1905.

NORTH ORMESBY GAS COMPANY, LIMITED.
RETORT-HOUSE ALTERATIONS.
TENDERS wanted for the Erection of Two additional RETORT BEDS on Regenerative System, with Ironwork complete; also extension of present RETORT-HOUSE.
Particulars to be had from T. Weatherly, Secretary.
Offers to be received on or before March 6, 1905.

PURIFIERS, &c., FOR SALE—Sets of 4 ft., 5 ft., 6 ft., 8 ft., 9 ft., 10 ft., 12 ft., 18 ft. squares; also 16 ft. by 12 ft., &c. SCRUBBERS, 8 ft. by 60 ft. 10 inch, 18 inch Square METERS. EXHAUSTERS up to 50,000 feet per hour in Stock. GASHOLDERS and TANKS, also New. State requirements.
Firth Blakeley and Co., Thornhill, Dewsbury.

GAS PLANT for Sale—I can always offer NEW and SECOND-HAND GAS APPARATUS, including Retorts and Fittings, Condensers, Exhausters, Scrubbers, Washers, Purifiers, Gasholders, Tanks, Valves, Connections, &c. Also a few COMPLETE WORKS. Compare Prices and Particulars before ordering elsewhere.
J. F. Blakeley, Gas Engineer, Thornhill, Dewsbury.

TO GAS ENGINEERS AND CONTRACTORS.
THE Advertiser having been in business as a Gas and Water Work Engineer and Contractor for more than half-a-century, during which he has Designed and Manufactured the Plant for a very large number of Works and Erected them in every quarter of the World, has determined, owing to advanced age, to DISPOSE of all his Drawings and Patterns (which are very numerous), together with an Introduction to his very wide Connection. The purchase might suit an already established Firm, or it might form the nucleus of a new one
The Advertiser will take the greater portion of the purchase price in a sound Company, either already in operation, or to be formed.
Suitable premises can also be obtained in the country, where labour is cheap, and within an easy distance of London.
Apply, by letter, to No. 4343, care of Mr. King, 11, Bolt Court, Fleet Street, E.C.

NEW Gasholder, 40 ft. diameter by 12 ft. deep, with Steel Standards; also new STEEL TANK to contain same.
Write J. Wright, 181, Queen Victoria Street, London, E.C.

TESTING PLANT FOR SALE—We have several small Sets of GAS APPARATUS, including Retorts, Condensers, Scrubber, Purifiers, Gasholders, overhauled and guaranteed, or New throughout.
Firth Blakeley and Co., Thornhill, Dewsbury.

FOR SALE, in good condition, Cast-Iron Plates for Two Walker Tower Scrubbers, 5 ft. diameter by 38 ft. high, with planed joints. Replaced by larger plant.
Address No. 4338, care of Mr. King, 11, Bolt Court, Fleet Street, E.C.

CITY OF CARLISLE.
TENDERS FOR GAS OIL.
THE Gas Committee are prepared to receive TENDERS for the supply of 1100 (Eleven Hundred) Tons of GAS OIL, for the Manufacture of Carburetted Water Gas, during a period of One Year from April 1 next.
Tenders, endorsed "Gas Oil," and addressed to the Chairman of the Gas Committee, to be delivered at the Office of the Town Clerk not later than Tuesday, Feb. 28, 1905.
Forms of Tender and other Particulars on application.
The lowest or any Tender will not necessarily be accepted.
By order,
W. J. Smith, B.Sc.
Engineer and Manager.
Gas-Works, Carlisle,
Feb. 15, 1905.

CITY OF CARLISLE.
TENDERS FOR PURCHASE OF TAR.
THE Gas Committee are prepared to receive TENDERS for the purchase of the surplus COAL and WATER GAS TAR to be produced at their Works for a period of One Year from April 1 next.
Tenders, endorsed "Tar," and addressed to the Chairman of the Gas Committee, to be delivered at the Office of the Town Clerk, not later than Tuesday, Feb. 28, 1905.
Further Particulars may be had on application.
The Committee do not bind themselves to accept the highest or any Tender.
By order,
W. J. Smith, B.Sc.,
Engineer and Manager.
Gas-Works, Carlisle,
Feb. 15, 1905.

CITY OF CARLISLE.
TENDERS FOR OXIDE OF IRON.
THE Gas Committee are prepared to re- ceive TENDERS for the supply to their Works of about 200 Tons of OXIDE OF IRON, delivery to be made over a period of One Year from April 1 next.
Tenders, endorsed "Oxide of Iron," to be addressed to the Chairman of the Gas Committee, and delivered at the Office of the Town Clerk, not later than Tuesday, Feb. 28, 1905.
Further Information may be had on application.
No pledge is given for the acceptance of the lowest or any Tender.
By order,
W. J. Smith, B.Sc.,
Engineer and Manager.
Gas-Works, Carlisle,
Feb. 15, 1905.

SELBY URBAN DISTRICT COUNCIL.
TO WELL SINKERS.
THE Urban District Council of Selby, Yorkshire, invite TENDERS for the construction of a BORING, 400 feet deep, to be carried out adjacent to the Boring recently completed at the site of the New Water-Works.
Copies of the Specification and Form of Tender, together with any other Information, can be obtained from Mr. Percy Griffith, M.Inst.C.E., F.G.S., 54, Parliament Street, Westminster, S.W., or from Mr. Bruce McGregor Gray, Assoc.M.Inst.C.E., Town Hall, Selby, upon payment of a sum of Five Pounds, which will be returned on the receipt of a *bonâ-fide* Tender.
Tenders must be delivered, in the proper sealed Envelopes, endorsed "Tender for Duplicate Boring," addressed to me at the Town Hall, Selby, not later than Twelve noon on Friday, the 10th day of March, 1905.
By order,
Jno. Hy. Bantoft,
Solicitor,
Clerk to the Urban District Council.
Town Hall, Selby,
Dated Feb. 16, 1905.

TYLDESLEY-WITH-SHAKERLEY URBAN DISTRICT COUNCIL.

THE Gas Committee of the above Council invite TENDERS for FIRE-CLAY GOODS, including RETORS, BRICKS, BLOCKS, TILES, FIRE-CLAY, &c.

Full Particulars and Quantities, with Form of Tender, may be obtained on application to Mr. R. H. Ginman, Engineer, Gas-Works, Tyldesley.

Sealed, endorsed Tenders, on Official Forms only, to be sent to the undersigned not later than Thursday, March 2, 1905.

By order,
WM. J. MATTHEWS,
Clerk to the Council.

Council Offices, Tyldesley,
Manchester, Feb. 10, 1905.

THE Middleton Corporation are pre- pared to receive TENDERS for the supply of CANNEL and GAS COAL, delivered at the Middleton Railway Station in such quantities and at such times as the Gas Manager may require. Quantity required, about 10,000 Tons.

Tenders, addressed to the Chairman of the Gas Committee, must be delivered at my Office on or before Saturday, the 4th day of March, 1905, endorsed "Tender for Coal or Cannel."

The Corporation do not bind themselves to accept the lowest or any Tender.

Further Particulars and Form of Tender may be obtained, by written application only, to Mr. E. E. J. Anderson, Gas Engineer.

All persons or firms Tendering must pay their workpeople the Standard or Trades Union rate of wages at least, and observe the trade conditions which attach to the various kinds of work for which a Tender is sent in.

FREDERICK ENTWISTLE,
Town Clerk.

Town Hall, Middleton, Feb. 15, 1905.

BROADSTAIRS AND ST. PETER'S URBAN DISTRICT COUNCIL.

RUMFIELDS PUMPING-STATION.

PUMPING MACHINERY.

TENDERS are invited for the Construc- tion, Delivery, and Erection, at the above Station, of a HORIZONTAL TANDEM COMPOUND ENGINE, Condenser, Well Pumps, and all Accessories.

Copies of the Specification and Plans can be obtained at the Office of the Council's Consulting Engineer, Mr. Percy Griffith, M.Inst.C.E., F.G.S., 54, Parliament Street, Westminster, S.W., on payment of a deposit of £5, which will be returned to those from whom *bonâ-fide* Tenders shall have been received on or before the date hereafter named. Early application is necessary, as only a limited number of copies will be issued to Contractors.

Sealed Tenders, on the Form provided for the purpose, must be delivered at the Offices of the Council on or before the 11th of March, 1905.

The Council do not bind themselves to accept the lowest or any Tender.

By order,
L. A. SKINNER,
Clerk of the Council.

Council Offices, Broadstairs,
Feb. 16, 1905.

THAMES VALLEY AND GORING WATER AND GAS COMPANY, LIMITED.

GAS-WORKS EXTENSIONS.
CONTRACT No. 6.

MILD STEEL GASHOLDER AND TANK.

THE Directors are prepared to receive TENDERS for the Construction, Delivery, and Erection complete of a MILD STEEL GASHOLDER and TANK at their Gas-Works, Goring-on-Thames.

Specification and Plans (prepared by the Company's Engineer, Mr. George H. Robus, Assoc.M.Inst.Mech.E.), may be seen and Particulars obtained from the London Offices of the Company, 20, Bucklersbury, London, E.C., any day after Friday, Feb. 24 (except Saturdays), between the hours of Eleven and One o'clock.

Sealed Tenders, endorsed "Mild Steel Gasholder and Tank," and addressed Directors, Thames Valley and Goring Water and Gas Company, Limited, Goring-on-Thames, Oxon, should reach me not later than Thursday, March 9, 1905.

The Directors reserve to themselves the right to accept the lowest or any Tender.

J. HUNT,
Secretary.

GOUROCK TOWN COUNCIL.

THE Gas Committee of the above Cor- poration invite TENDERS for the immediate Sale and Removal from their Gas-Works of One Telescope GASHOLDER (outer Lift 40 feet diameter; inner, 38 ft. 6 in. diameter; depth, 14 ft.) with Cast-Iron Columns, Girders, Back-balance Weights, &c., complete. Only top course of plates of Cast-Iron TANK, with Column Brackets, for sale and to be removed. The Holder is in good condition, and can be seen working. No reasonable offer will be refused.

Sealed Tenders, endorsed "Removal of Gasholder," to be lodged with the subscriber not later than Monday, the 6th of March, 1905.

The Committee also invite OFFERS for the following PLANT in use at their Works:—

1.—One Set of Five Annular CONDENSER PIPES, 18 ft. by 31 in. outside, and 21 in. inside, 8-inch Connection.
2.—One Young's WASHER, 10 ft. by 6 ft., Eight Tiers of Washing Plates, 8-inch Connection, and
3.—Three PURIFIERS, 12 ft. by 6 ft. by 3 ft. 6 in. deep, and Four Tiers of Grids and Change Valve, 8-inch Connection.

The above are in good condition, but have to be removed shortly for Plant of larger capacity.

Sealed Tenders, endorsed "Offers for Gas-Works Plant," to be lodged with the Subscriber not later than the 6th of March, 1905.

A. DOUGLAS MURRAY,
Town Clerk.

Gourock.

PORTADOWN GASLIGHT COMPANY, LIMITED.

NEW RETORT-BENCH.

THE Directors of the Portadown Gas- light Company, Limited, are prepared to receive TENDERS, Specifications, and Drawings, for a BENCH of RETORTS to consist of Three Ovens, with Eight Retorts in each Oven, with separate Hydraulic Main for each Oven, and all Ironwork complete. Erected Complete.

Tenders to be addressed to James Nisbet, Manager, Gas-Works, Portadown, Ireland, who will give any information required.

Tenders to be received not later than the 1st of March.

The Directors do not bind themselves to accept the lowest Tender.

Gas-Works, Portadown, Feb. 7, 1905.

HARROW AND STANMORE GAS COMPANY.

NOTICE is Hereby Given, that the ORDINARY HALF-YEARLY MEETING of the Proprietors will be held at the Albion Tavern, Aldersgate Street, in the City of London, on Monday, the 6th day of March, 1905, at Twelve o'clock precisely, to receive the Directors and Auditors' Reports, to declare a Dividend, to elect a Director and an Auditor, and to transact any Ordinary Business of the Company.

The REGISTER OF TRANSFER BOOKS WILL BE CLOSED from Feb. 28 until March 6, both inclusive.

By order of the Board,
J. L. CHAPMAN,
Secretary.

Gas Office: Roxeth, Harrow,
Feb. 13, 1905.

ISSUES BY AUCTION OF GAS AND WATER STOCKS AND SHARES.

MR. ALFRED RICHARDS begs to notify that his ISSUES by AUCTION under PARLIAMENTARY POWERS of STOCKS and SHARES in LONDON, SUBURBAN, and PROVINCIAL GAS and WATER COMPANIES take place PERIODICALLY at the Mart, TOKENHOUSE YARD, E.C.

Terms for Issuing such Capital, and also for including Gas and Water Stocks and Shares belonging to Private Owners in these Periodical Sales, can be obtained on application at MR. ALFRED RICHARDS' OFFICES, 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the
SOUTHEND GAS COMPANY.

NEW ISSUE OF £20,000 NEW ORDINARY "B" STOCK, and £6500 FOUR PER CENT. PERPETUAL DEBENTURE STOCK.

MR. ALFRED RICHARDS will Sell the ABOVE BY AUCTION, at the Mart, E.C., on Tuesday, March 7, at Two o'clock, in Lots.

Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

GAS SHARES.

WOKING DISTRICT GAS COMPANY, LIMITED,
477 £5 ORIGINAL SHARES,
Ranking for a Maximum Dividend of 10 per cent., at present receiving 7 per cent. per annum.

ASCOT DISTRICT GAS COMPANY,
170 £10 SHARES,
Ranking for a Maximum Dividend of 10 per cent., now receiving 5 per cent. per annum.

TO BE SOLD BY AUCTION, BY

MR. ALFRED RICHARDS, at the Mart., E.C., on Tuesday, Marc 7, at Two o'clock, in Lots, by order of the Executor of Mrs. F. Williams, deceased.

Particulars of Messrs. A. F. CHURCH AND SONS, Solicitors, 51 and 52, FENCHURCH STREET, E.C., and of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

CARDIFF GASLIGHT AND COKE COMPANY.

(INCORPORATED THE 5th OF MAY, 1837.)

THE Directors of the Cardiff Gaslight and Coke Company are prepared to receive, not later than Tuesday, the 7th of March, 1905, at 11 a.m., sealed TENDERS for £8500 "D" STOCK, bearing a Maximum Dividend of 5 per cent. per Annum, in pursuance of the powers of the Cardiff Gas Act, 1887.

Conditions and Form of Tender, together with any further Information, may be obtained on application to the undersigned.

By order,
GEORGE CLARRY,
Secretary.

Gas Offices, Cardiff, Feb. 1, 1905.

NEWCASTLE-UPON-TYNE AND GATESHEAD GAS COMPANY.

SALE OF £50,000 ORDINARY STOCK.

THE Directors offer for Sale by Tender £50,000 ORDINARY STOCK, to be issued under the provisions of the Newcastle-upon-Tyne and Gateshead Gas Act, 1901. Applications receivable up to Ten a.m. on the 27th of February, 1905.

When gas is charged at the present rate of 2s. per 1000 cubic feet, the Authorized Dividend is £4 12s. 6d. per cent.

Any amount of Stock, being not less than £5, or a multiple thereof, may be applied for. A deposit of 5 per cent. on the nominal amount of Stock applied for must accompany each Tender, and the balance be paid on or before the 29th of April, 1905. Interest at the rate of 4½ per cent. per annum will be allowed upon prepayments.

MINIMUM PRICE, £105 PER CENT.

The Company's profit for the year 1904 was £113,354; and after paying all interest and full statutory dividends, there was left a surplus profit of £21,530.

During the last Five Years, the number of consumers has increased by 32,695, and the gas sold by 438,954,000 cubic feet.

Prospectuses and Forms of Tender will be sent on application to the undersigned.

THOS. WADDOM,
Secretary.

Newcastle-upon-Tyne, Feb. 6, 1905.

THE Derwent Valley Water Board is prepared to receive a LIMITED AMOUNT OF MONEY, upon Mortgage, at £3½ per cent. per annum, either for a Term of Years, not exceeding seven, or Repayable at Six Months' notice from either party.

The Moneys required for carrying out the Works of the Board are secured upon the Revenues and Rates of Derby, Leicester, Nottingham, and Sheffield in due proportion.

Applications to be sent to Mr. W. Gill Hodgson, Accountant to the Board, Bamford. *viâ* Sheffield.

By order,
O. B. STEWARD,
Clerk to the Board.

ESSEX,

ADJOINING HEDINGHAM RAILWAY STATION (C. V. R.), WITH POSSESSION FROM LADY DAY, 1905.

MESSRS. BALLS will Sell by Auction, at the Mart, Tokenhouse Yard, London, E.C., at an early date.

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Printed Particulars and Conditions will be in circulation after the 25th inst., and may be obtained of the Solicitors, Messrs. MORTON AND SON, Halstead, ESSEX, and of Messrs. BALLS, Auction and Estate Offices, Castle Hedingham, ESSEX, and Haverhill, SUFFOLK.

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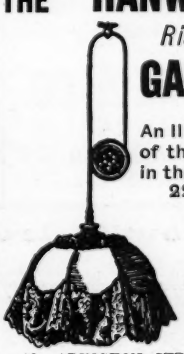

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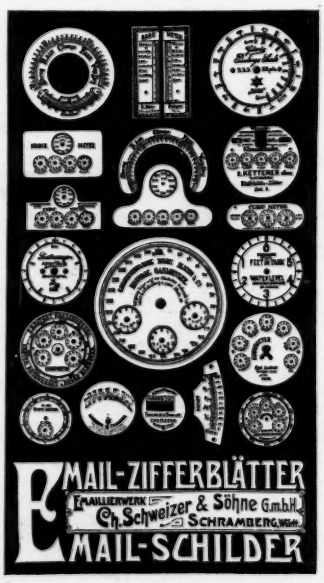

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[See Illustrated Advertisement, Feb. 7, p. 334.]

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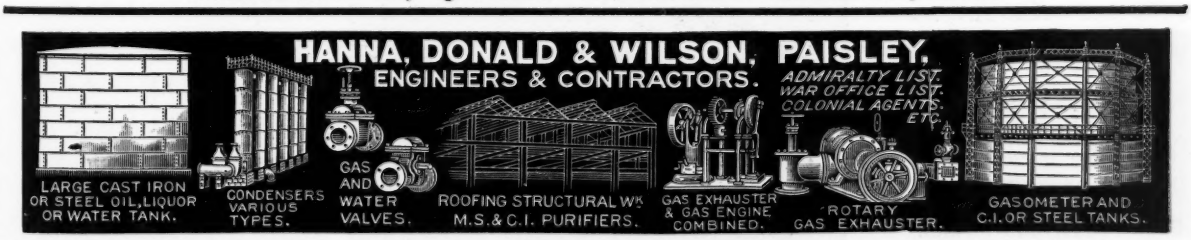
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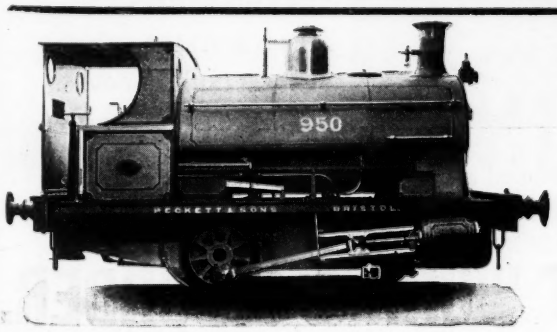

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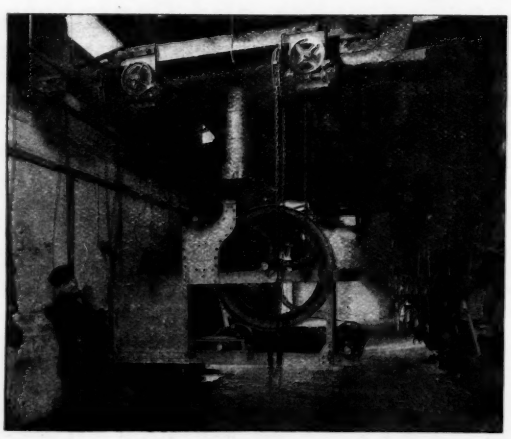

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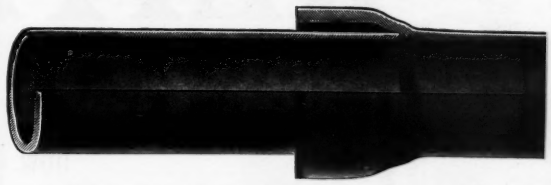

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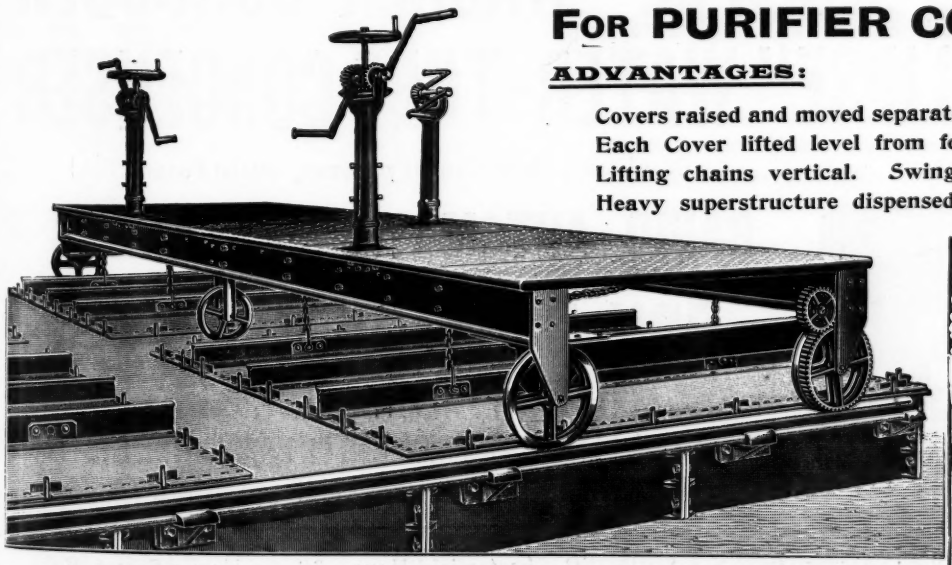

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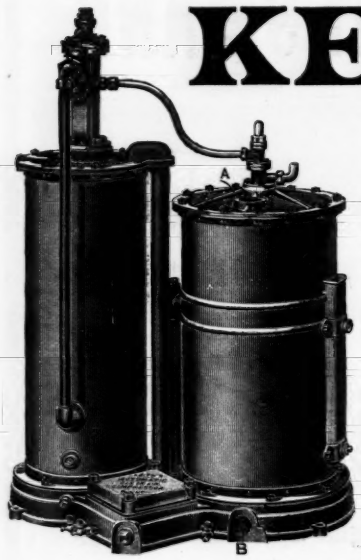
Heavy superstructure dispensed with.

Prices and Particulars on Application.

London Office: 165, GRESHAM HOUSE, OLD BROAD STREET, E.C.

THE KEITH LIGHT



No. 3 Compressor, enclosed pattern. Water Driven.

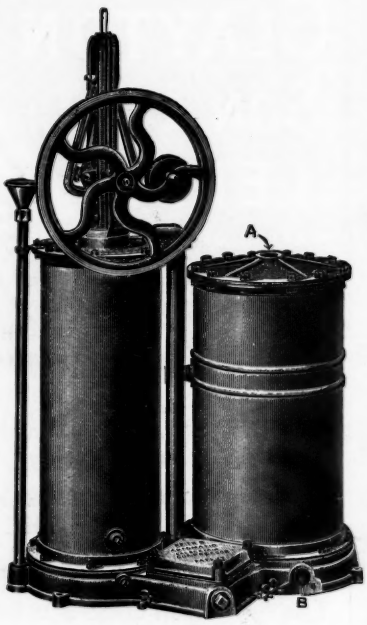
1600 Installations now in use.

Keith's Patent Gas Compressors are perfectly Automatic and require no attention

Non-fluctuating.

Made in various sizes and arranged to give any constant pressure from 2-inch upwards.

DRIVEN BY ANY AVAILABLE POWER.



No. 3 Compressor. Power Driven.

Patentees and Manufacturers—

JAMES KEITH & BLACKMAN CO., LTD.,
27, FARRINGDON AVENUE,
LONDON, E.C.

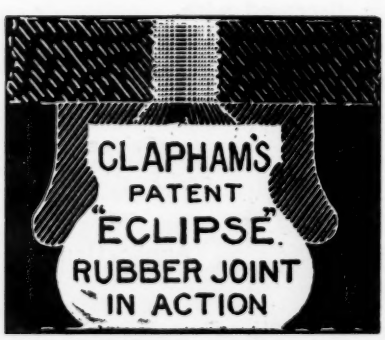
CLAPHAM BROS., LTD.

ESTABLISHED OVER 60 YEARS.] SOLE MAKERS OF **KEIGHLEY.**

Laycock & Clapham's Patent **"ECLIPSE" WASHER-SCRUBBER**

Clapham's Patent **"ECLIPSE" WATER-TUBE CONDENSER**

Clapham's New Century Cover, with Patent



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MAKERS OF ALL IRONWORK FOR
CARBONIZING PLANTS, FOR INCLINED OR HORIZONTAL SYSTEMS.
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